office management

the magazine for management executives

YEAR BOOK ISSUE

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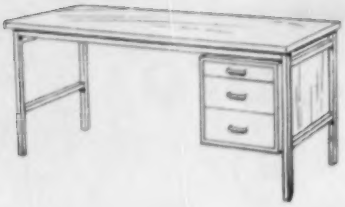

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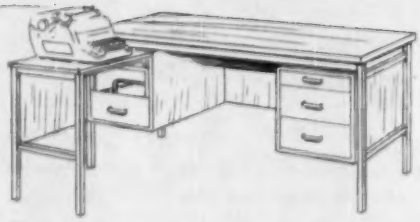

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JANUARY, 1956

Vol. XVII No. 1

office management

Office Methods, Equipment, Personnel, and Purchasing

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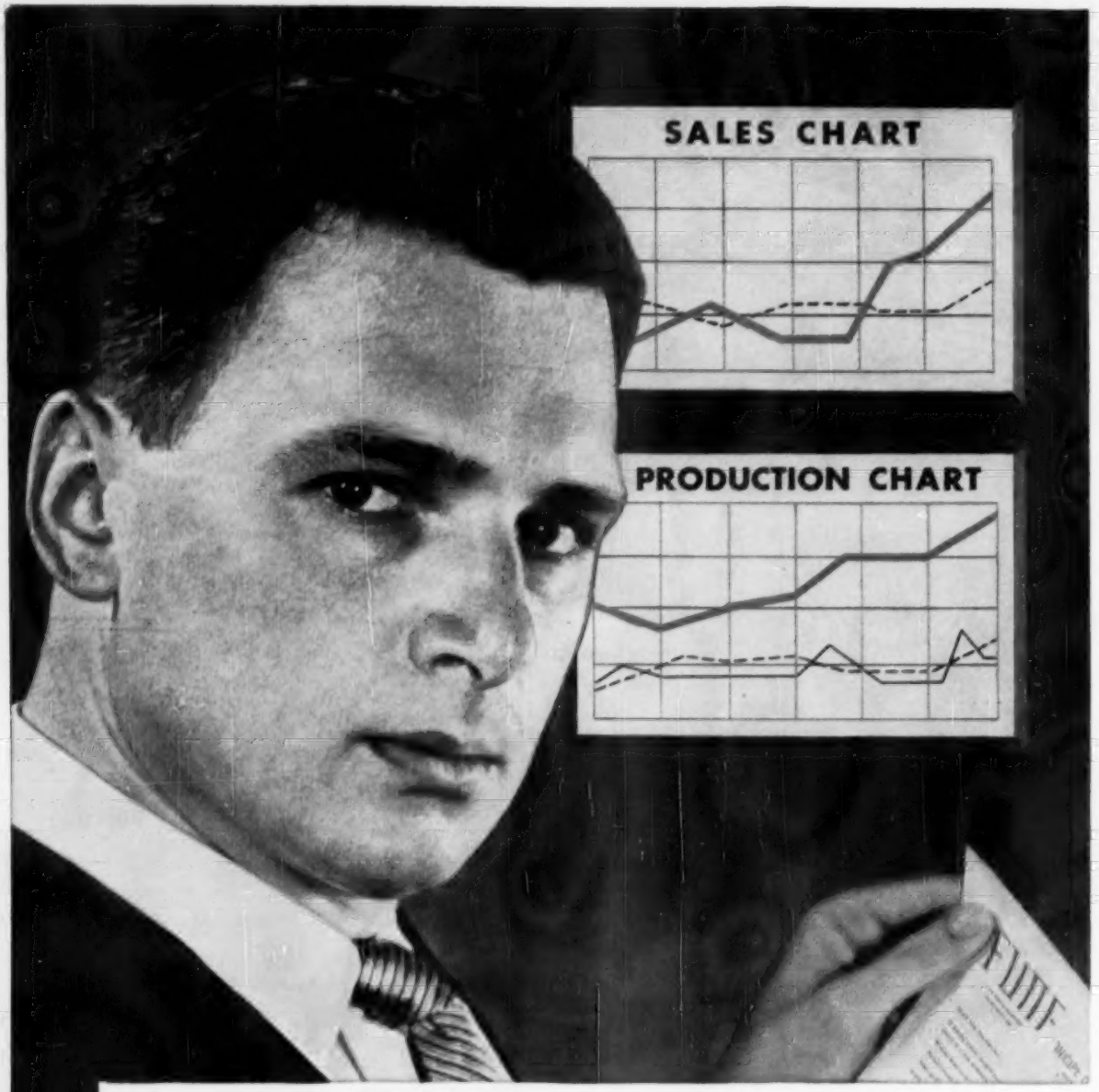

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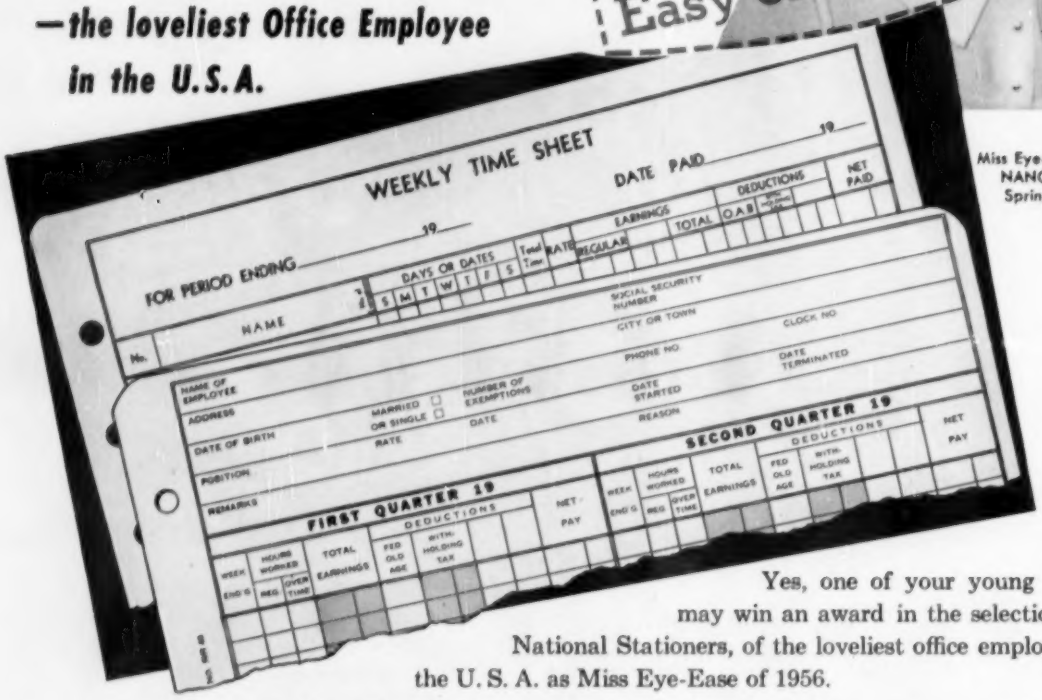

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Our Yearbook Issue

editorial

OFFICE MANAGEMENT, with pride presents herewith something entirely new in its long service to the world of the office—its first Yearbook Issue, initiating a long-considered plan of making the first number of this magazine each year an issue which will summarize significant accomplishments and trends in the development of office efficiency during the prior twelve months and indicate, so far as it is possible to do so, the lines along which the direction of office management may be expected to progress during the twelve months to come.

For each of the main divisions of office management, recognized authorities discuss the current status of their special field or fields, highlighting what they regard as significant and alerting the reader to trends they foresee as of high importance in the forward march of the office during 1956.

These experts cover the subjects of automation in the office; personnel in its varied aspects; systems, forms control, and records; and office layout and furnishings. The high points brought out through the past year in our monthly "Tools of the Office" series are coordinated and highlighted, and there is a most comprehensive and useful descriptive listing of brochures, catalogs, and booklets relating to the office and its needs. And additionally there is a special section devoted to comprehensive text and pictures on the six offices which have won this magazine's "Office of the Year" Awards for 1955.

All this is in line with what OFFICE MANAGEMENT has taken as its objective from its establishment—to be of the greatest possible practical aid to the executive concerned in any important way with the set-up and operation of the office. Every passing year finds the office engaging wider and closer attention on the part of American enterprise as its center of direction for all the activities of all enterprise. In the eyes of the world the prestige of the American office is constantly rising, as a vital key to our success in getting things done. Even those nations which do not love us and which have constantly something to say in criticism of what we say and what we do, take the American office as a model to copy!

OFFICE MANAGEMENT is edited for the people who make our offices great —for those engaged in the actual direction of office activities and for the growing number of other executives who have a hand in determining the policies of the office. This magazine regards its primary function as keeping all these factors in management constantly alert to significant trends in every type of office design and operation, in every worthwhile innovation in methods, procedures, and systems, and in all the other essentials called for in making the office perform its vital tasks with peak efficiency.

It is our hope that this annual Yearbook Issue will greatly enhance for our thousands of subscribers in the office field the value of a business magazine they have been so generous in praising for the help it has been to them.

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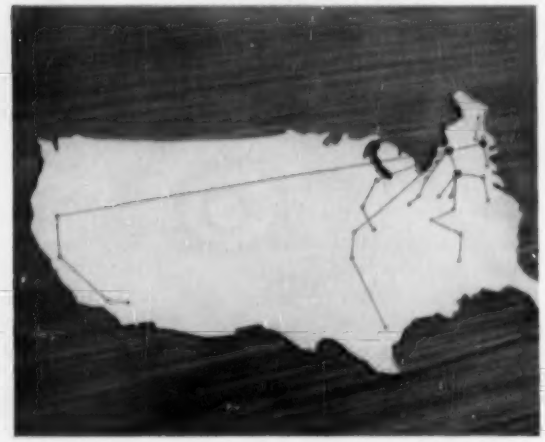

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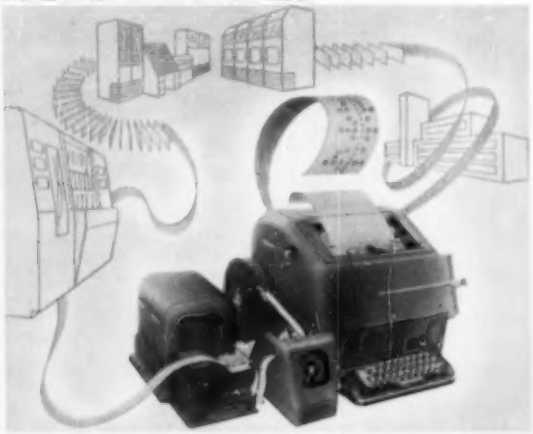

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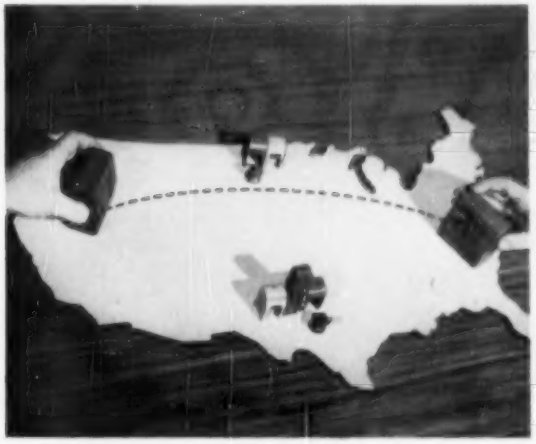

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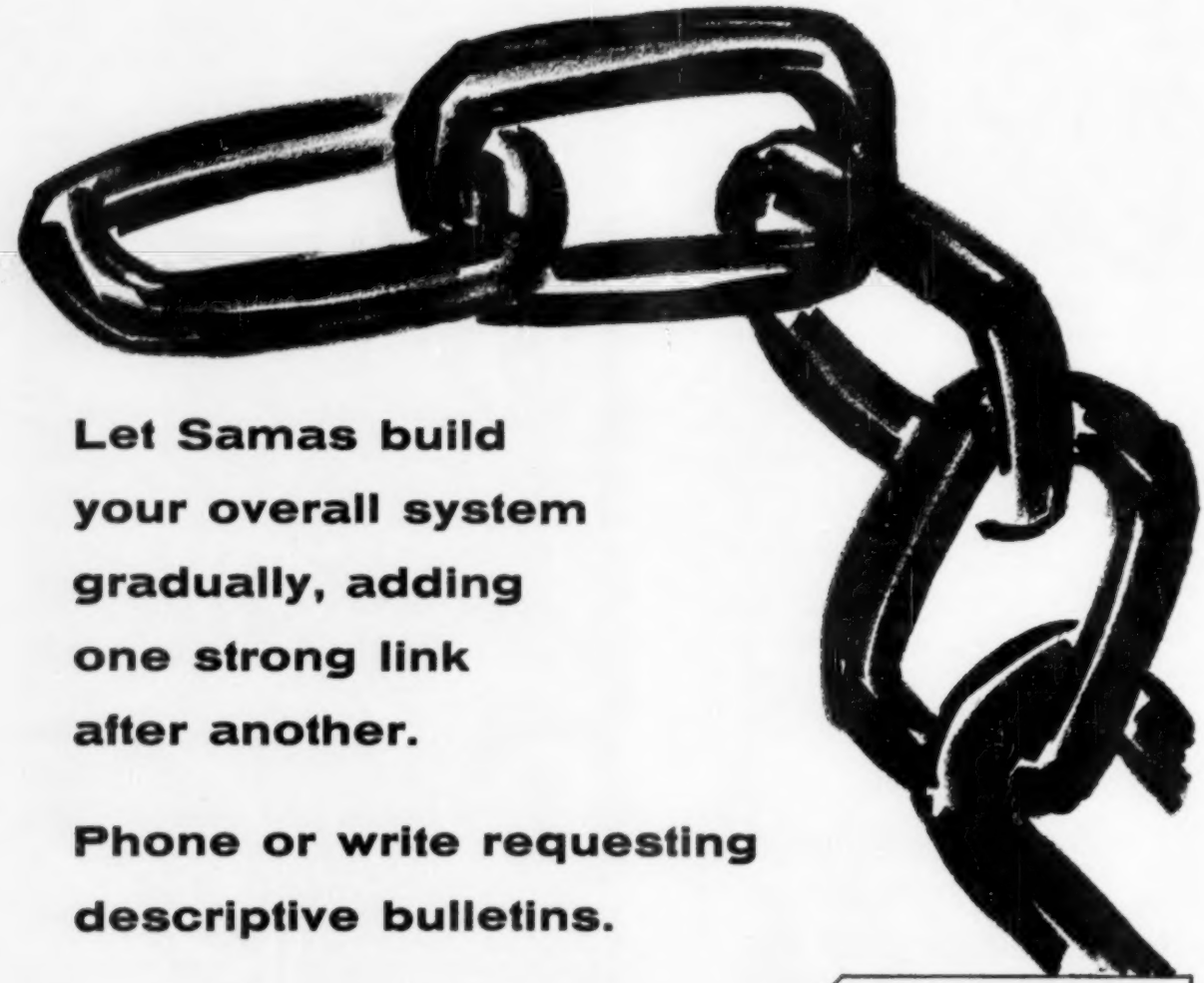

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AUTOMATION
IN THE OFFICE

Where do we stand today?

As 1956 begins, "automation" remains the most controversial subject in the whole office field, not because anyone denies its significance, but because there is such a wide range of opinion as to exactly how it is to be achieved. The articles in this section, expressing as they do quite different—even contradictory—viewpoints, reflect that controversy.

Office automation, 1956—fact and fantasy

True automation is not a matter of glittering machines that do "everything", but a system concept that now, for the first time, can be applied by every office—

by Robert M. Smith
Editor, OFFICE MANAGEMENT magazine

AUTOMATION is the most fashionable and the most ambiguous word in business today. It is being used recklessly by some, cautiously by others, incorrectly by a great majority. We are told it is an illusion; we are told it is a reality. We are told it may come in the future; we are told it is here today.

Specifically, what is automation? How far have we progressed toward achieving it in the office?

Basically, automation implies not only the processing of work by machines or other automatic means, but the control of that processing to a certain degree by automatic means. The degree of automatic control is the relative degree of automation.

As such, automation in a typical work line would mean not only the performance of individual work actions by automatic means but the automatic forward movement of the unit being worked on, and the regulation and control of the machines doing the work by a mechanical medium.

Robert M. Smith

Automation, in other words, implies the replacement of a human machine supervisory level by a mechanical machine supervisory level.

That is an overall definition, which could apply equally well to the office and the factory. But can the two be equated? Is the work pattern, the basic purpose of office work, similar to the factory pattern and purpose? Can they be related?

Equating office and factory

Let's see what the similarities are. The factory takes in raw material or semi-finished material at one end of a production line, and turns that material into useful products.

The office performs a basically similar function. It absorbs raw material —information—at one end of a processing line, and transforms that material into finished end products useful within and without the company, even though they are not the primary sales products of the company.

The dissimilarities between the two are based on the fact that the factory controls its source of raw materials, and can insist upon standards for those materials. The factory then transforms those materials into a strictly limited number of end products.

The office has no such control over the source of its raw material. Information comes into the office in a variety of ways—by phone, by wire, by letter, by casual conversation, by gossip. Moreover that raw material must be used to make a wide and heterogeneous number of end products; each bit of information must be placed in varying combinations with other bits of information to make differing end products.

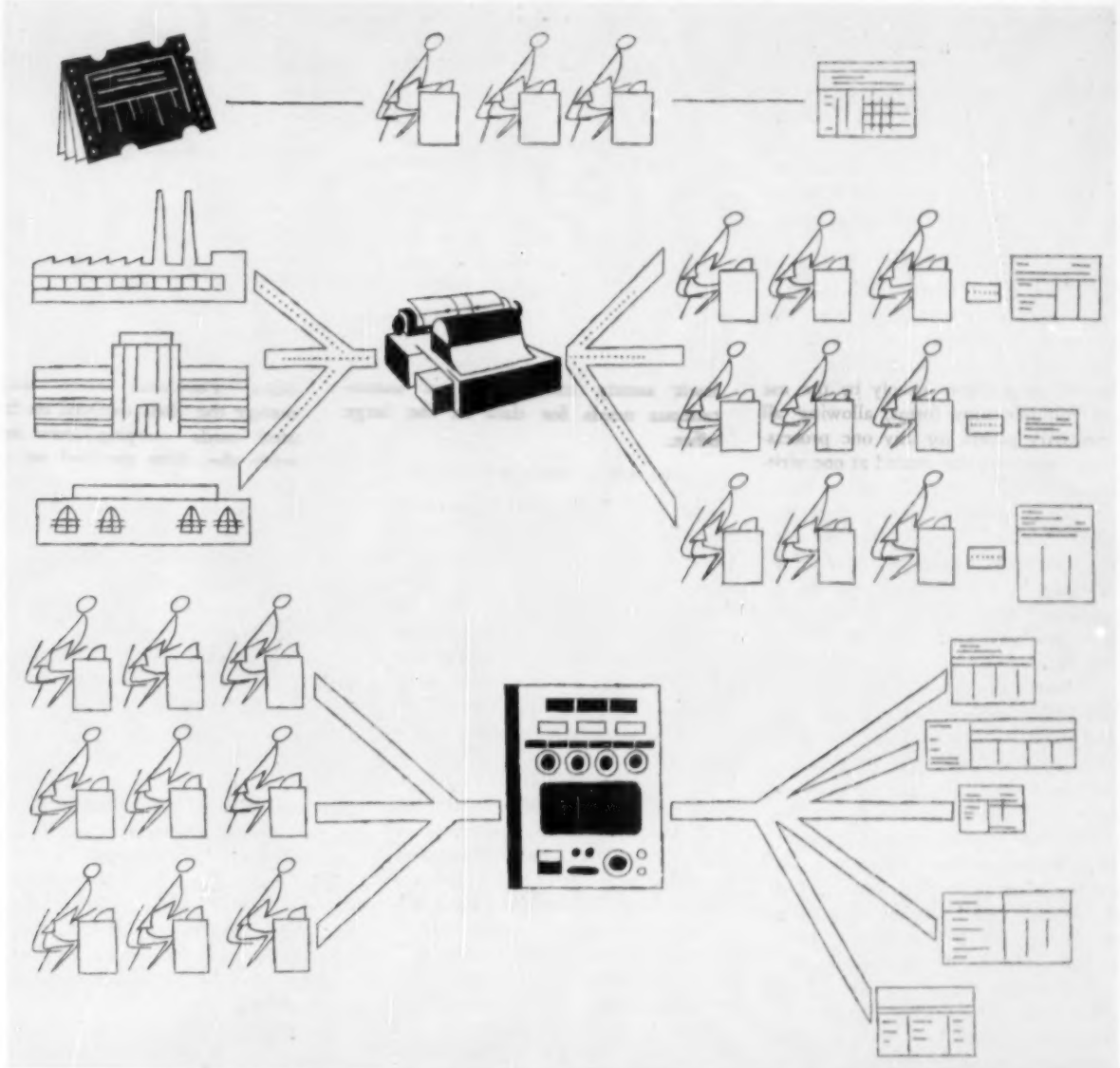
The office processing problem then is more complex than the factory's, and seems at first glance entirely outside the potentialities of automation.

But is it really? Can the pattern of automation be applied to the office by any means at all?

Let's assume two things can be done within the office. Let's assume all incoming information, no matter in what form it arrives, can be captured at its point of entry into the company in a standard form. Let's suppose further that the selected form permits subsequent processing of that information by mechanical or some other means that makes unnecessary any manual re-copying of the basic information, and that to a degree moves that information forward toward its end product automatically.

And let's assume further that deviations from the routine flow of information—bits of information that require special processing, out of the ordinary routine, are identified at their point of entry into the company, and separated from the great mass of more or less standard raw material so they can be given special handling.

If we can do these two things, then our office work flow pattern—or a large part of it, at any rate—can be made basically similar to the factory work flow pattern. By capturing all incoming information and placing it in standard forms at the point of entry into the company, the office can achieve the same standardized "raw material" which the factory has as a matter of course. By identifying and setting aside unusual types of material, un-



A degree of automation is possible today for every office, regardless of size. The very small office may achieve it by one medium, the very large by another. The basic concept holds good for each.

usual bits of information which will require special handling, the office can push the great mass of its raw material, captured and forced now into standard forms, through a work sequencing process which is more or less routine.

And anything which is strictly routine, which does not vary markedly from a pre-set pattern, can be automated to a degree, just as the manufacture of refrigerators can be automated to a degree.

That seems to be our answer, and our solution. If the office meets these two conditions, it can make the great bulk of its work processes analogous to factory work processes. When that has been done, automation becomes a possibility within the majority of work processes.

And that is where automation in the office is coming from today—from a concept of work organization—not from the various new machines that are taking over part of the clerical work load. The new machines make it possible to extend that concept, but it is the concept itself which is basic; the reduction of the majority of the office's work to the same routine patterns based on standard materials that have characterized the factory's operations for several decades. Machines—of all types—are useful in this context. But no two offices require precisely the same machines. The machines, in other words, are subsidiary to the pattern applying in any given instance.

Thus, different offices have different needs. Those needs can be met at different levels by different means. But all offices can adopt the pattern which will give them automation. The degree of automation will vary. But a degree will be achievable **in each.**

Let's see how our twin principles of capturing all incoming information in standard forms that will permit that information to travel through the office without ever being manually recopied, and with a minimum of human intervention or control—the integrated

data processing concept—and our principle of separating exceptions from routine so that the great mass of material flows through simple automatic channels might be applied in different levels of offices.

The means vary in each case. But the results are very much the same in each case.

I.D.P.—Primary level

Let's consider first of all a very small office with only a few workers. In such an office the movement of data could be standardized and automated to a degree simply by the use of multiple copy forms, allowing all necessary papers for any one processing sequence to be created at one writing. Thus, we put the integrated data processing principle into operation; all basic fresh information for any one work sequence is captured at the point of entry in a form that will allow that information to travel through the office without ever being manually recopied.

This assumes a very simple office, indeed. Moreover, it merely relieves that office of the necessity of repeating static information (although that relief alone would cut the average office's work burden immensely). The actual processing steps would still have to be performed manually or by manual operation of simple machines. The simple entry of incoming data on a multi-part carbon interleaved form would not automate in any way the operations that must be performed on those data. It would however, permit the data to flow in a straight line toward the ultimate product, and simultaneously would create all the necessary by-products of those data for uses other than the ultimate product—records, ledger postings, etc.

And that represents a certain stage of automation. It is a stage which has been possible to us for some time through such relatively old concepts as forms revision and work simplification techniques. It, in other words, represents in the office evolution approximately the stage our factories had achieved through the assembly line technique before self-regulating control machines to guide the action of primary processing machines were introduced.

But this type of technique, which is the road to automation, at one time was restricted in its application to the very simple office. It is only recent machine developments that have made it possible to extend this concept to the very large office.

The reasons are simple. The very large office, by its very size and the volume of its work, makes many more demands on any one piece of information than the small office does. Such a relatively simple device as carbon-interleaved forms, although it must be the basis of automation within any one unit of the large office (the unit being the counterpart of the small office described above) can never by itself satisfy the variety of simultaneous needs for data in the large office.

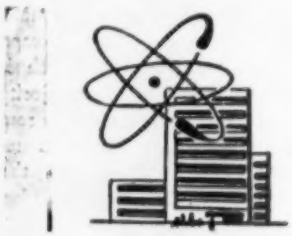
Machines extended concept

The result is that our large offices have in the past been handicapped vis a vis the small office in achieving even this primary level of automation—the elimination of the need for constant recopying of the same data.

This is the significance of the machine developments that have come so rapidly in the past few years. The machines have made it possible for the same concept which once could conveniently be applied only in the very small office, or in the small departmentalized work units of the large office, to be applied from start to finish of an entire processing sequence in a large office.

Moreover, the machines have added a new dimension to the type of rude automation possible through primary application of integrated data processing—they have incorporated various of the actual processing and control steps into the automation sequence.

Punched cards were the forerunner of the machine applications which fit logically into office automation in the medium sized and large office. The development of punched cards made possible for the first time an entire sequence of office operations performed automatically. Moreover, punched cards gave the large office the same advantage available to the small office; the entry of fresh information in such a form that it could be used over and over again without need for manual recopying.



The first "common language"

Punched cards also offered the possibility of holding static information—such things as the name and address of a steady customer, his discount rates, his credit terms—in a permanent form that was also a dynamic form, which cut down still further the need for repeated manual recopying of the same data. Punched card units could merge the data carried on freshly created cards carrying new information with the data carried on permanent cards carrying static information to produce individual transaction cards. They could carry these data forward through a whole series of sequential operations each of which was automatically controlled and carried through. Human effort was reduced to switching control boards on the various punched card units, and physical transfer of the punched cards from one machine to the next in the sequence.

Thus, punched cards gave us the first application of the "common language" concept. They represented a mechanical medium that could transmit information and instructions from one machine to another, without the need for human re-entry of data, and without the need for human step-by-step operating instructions to each of the machines.

But they had two great limitations. Punched card applications were mainly restricted to the world of accounting and bookkeeping machines; punched cards could not automatically transmit information across space. The cards had to be physically transported from one machine to another in order to reproduce the information they contained.

This great lack was met by the application of a medium which had been available for some time before office planners saw its full possibilities—five channel punched paper tape, the standard telegraphic communication tape.

This tape, operating much on the fashion of the old player piano roll, is perforated with various combinations of holes that can represent the 26

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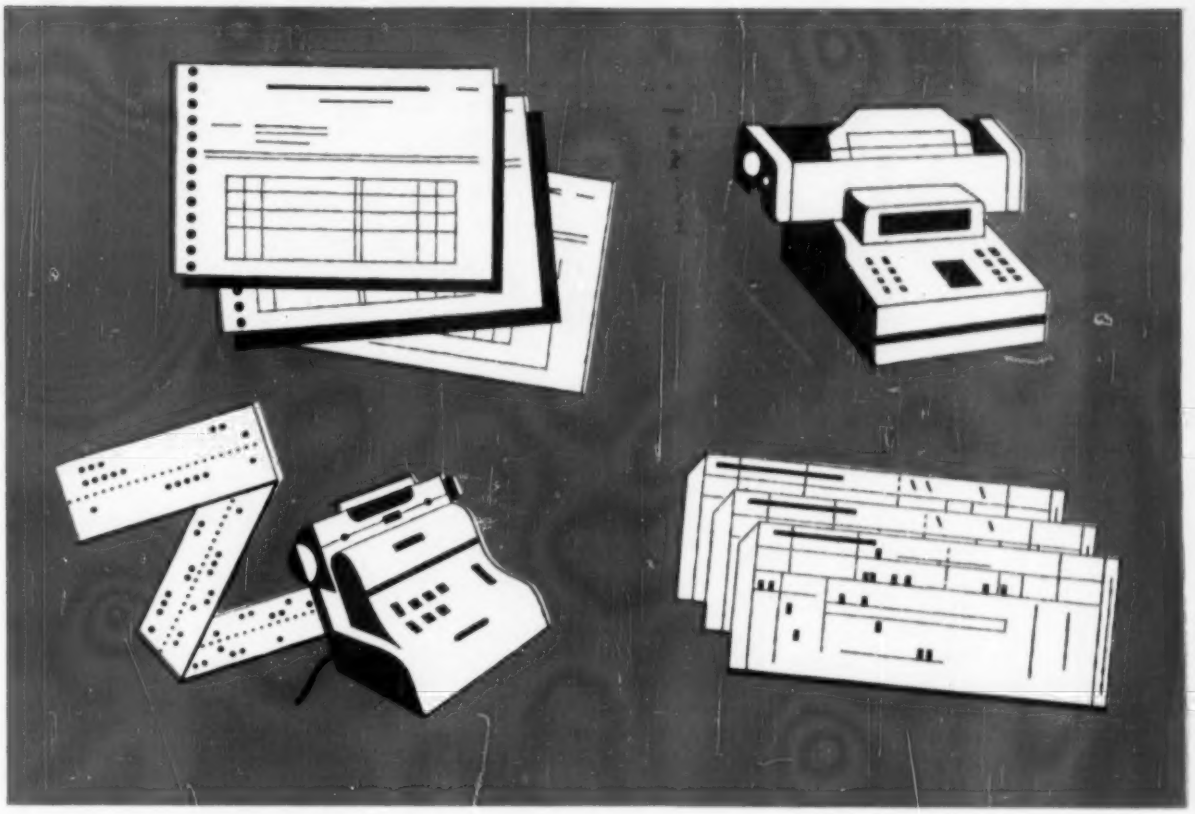

Automation is an evolution, not a revolution

"Automation" has been a siren song to many sober businessmen; actually, it's merely another step forward in a long continuing improvement of office procedures . . .

by W. P. Livingston

OFFICE AUTOMATION, a phrase that has found so many definitions, is expanding into new dimensions every day, making the task of the harassed office administrator ever more difficult and confusing. How are we to evaluate it? How do we achieve it? What will it do for us?

What can we believe about it?

We must find beliefs, facts, truths, in the field that are solid, that we can depend on, to give us a foundation for constructive thinking and planning. And we must find them fairly quickly; the pressure for the development and installation of new procedures is growing heavier daily.

Management, on the one hand, deluged with publicity, with articles, with rumors of vast increases in efficiency and vast decreases in costs, is demanding quick action. "Let's do this; let's buy that; let's get on the bandwagon fast" is its attitude, even though climbing on the bandwagon too fast is almost a sure guarantee of taking a bad fall.

On the other hand, we have the line personnel who are supposed to accept the new electronic wonders, and

W. P. Livingston

Mr. Livingston, who is a vice-president of the Bankers Trust Company, New York, pioneered many of the punched card procedures which have influenced banking procedures so deeply. Former articles of his which have appeared in *Office Management* include "Punched Card Systems in the Modern Office", which appeared in the April, May, and June, 1951, issues, and "Punched Card Systems at Management Level", which was published in August, 1953.

make them work. Quite understandably, they dig in their heels, and don their best defensive attitude. Invisible records? Daily procedures carried out through the clicking transistors of an electronic brain? Let's see it work! Prove it will work!

At the risk of sounding negative, I believe there is often more sound judgment expressed in the latter attitude than in the former. A hastily organized adventure into heavy equipment can be disastrous to a company, not only in terms of wasted money, and bogged-down procedures, but also because the child is often so badly burned that it resists any further innovations almost blindly.

Yet we are faced on every side by just such adventures, even though every company that has made a notably successful systems changeover, or has installed elaborate electronic equipment, has stressed that the period of preparation for use of that equipment is vital. These companies emphasize that it is the planning done during this period that spells success or disaster for the installation. Incidentally, many report that this planning also creates improvements in procedures—entirely aside from eventual use of new equipment—that account for a large percentage of the total overall savings achieved under the new way of doing things.

Still, it is small wonder that businessmen faced with these new units sometimes feel that the machines are so incomprehensible that they must have almost magical abilities, and that acquiring such an intricate unit must be an automatic solution to their problems.

Enter the mathematician

This is a mathematician, Dr. A. S. Householder, president of the Association of Computing Machinery, talking of the "thinking" of an electronic computer:

"The machine in effect thinks that number lies between 1 and —1. Suppose the number ½ is in cell number 10, and ¾ is in cell number 11. Suppose you ask the machine to add the numbers in those cells 10 and 11, and then to put the results in cell number 12. There is no machine word for 1¼, which is the true sum, and cell number 12 will receive instead the word for —¼. And if you ask the machine to divide the number in cell number 10 into the number in cell number 11, and to put the results into cell number 13, the machine will go through certain operations, and put a number into cell number 13, but it will not be the true quotient 1½. When you are planning a computation, therefore, you must take care that everything is properly scaled and that all results will lie on the proper range. With this understanding, we can get on with the problem."

To make use of such machines, we cannot feed into them just the same information in the same forms that we are currently using. We have to build from the beginning, we have to revise the forms, the flow, the very types of information which we are currently using.

We have to recognize this fully, and we have to realize also that the new machines available to us today are not new and wondrous contrivances totally divorced from every machine that has ever existed in the past. They can do exactly the same things that are now being done by other machines; they cannot perform any single operation that cannot be duplicated by other simpler machines.

Their great advantage lies in the speed with which they do their work, and the fact that they can carry out an entire series of operations within themselves.

There lie their two major advantages over other machines. From those two advantages stems the fact that electronic data processors can carry out operations which have never before been physically possible.

If this is so, why have we been so dazzled by the possibilities of our new equipment that hard-headed businessmen have sometimes behaved like children who wanted a new toy, and plunged their companies into risky and ill-considered financial ventures?

I think one reason is that our new machines were developed during a period when business was looking for a panacea. An historical picture may give us a little better perspective on what has happened. As a nation we have been concentrating for nearly two decades now on the importance of reporting tools. This trend has been spurred by the postwar competition with the Soviet world.

Simultaneously with a period of boom and a "seller's market" in labor, we have been inheriting in all phases of business and industry the generation born in the depression years that began in 1929. Our human labor source has been growing smaller at the very moment when our labor demands have been rising.

While this has occurred, there has been a twin development; people have been resisting more and more place-

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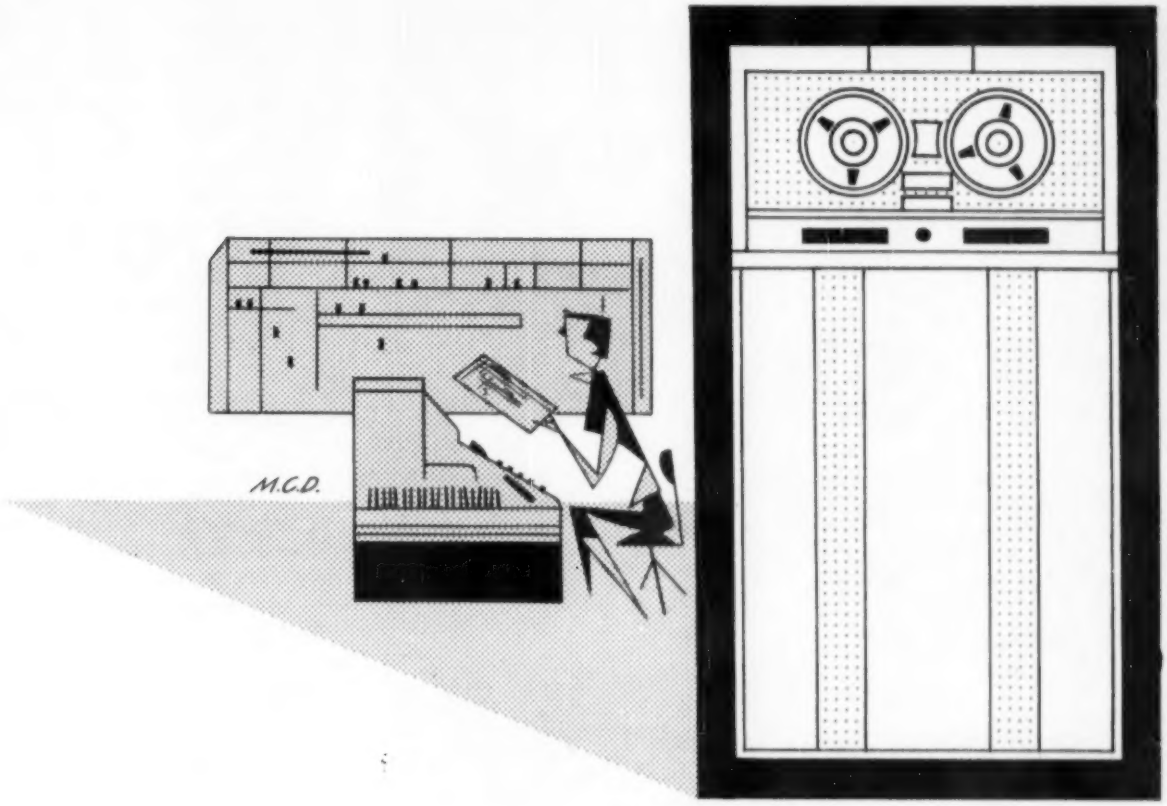
A clerical error is a major disaster in an electronic processing unit



Punched cards – are they obsolete?

Are punched cards—so long the backbone of automatic bookkeeping operations—becoming outmoded? The author says "yes"!

by Robert E. Slater

THE QUESTION of whether or not punched cards are becoming obsolete has been asked by management many times during the past several years. It is being asked a great deal more since the advent of magnetic tape and electronic computer systems. Management by its very interest in the subject indicates it has a problem with punched card record keeping that it would like to resolve. I am not prepared to say how long it will take to find the complete answer—one, five or ten years—but I am convinced that the magnetic tape of today, plus future developments, will tend to reduce substantially the need of the punched card in business accounting and statistical applications. This subject is a highly controversial one just as many other revolutionary changes have been subjects of heated debate in the past.

The punched card has been used by industry and government for a long time. It has served and is presently still serving a very useful purpose in the accounting field, the scientific and engineering fields and many other fields of endeavor. Punched cards played a very important part in World War II, and I believe the hostilities would have been prolonged many months if business and our armed forces had been compelled to go along with manual methods for compiling statistics and other such data. However, how many have asked themselves this question: "When was the last significant change made to a punched card?" The answer is—for users of

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the eighty column card, 27 years ago, for it was in 1928 when the first eighty column punched card was introduced with its rectangular hole; for the ninety column card, 24 years ago. To the best of my knowledge, no change has taken place in the basic design of the card for seventy years. Impossible, you say —to the contrary, it is true.

At the present time a punched card is 3¼ inches wide, 7⅜ inches long and contains less than one hundred decimal digits (density) of information. It is my understanding that in the year 1880, Dr. Hollerith, an engineer, designed a machine for compiling the United States census, using a punched card of the same dimensions as cards presently used. After all these years, during which the punched card has been the only means of storing large quantities of information for mechanical handling, it is no wonder that many well informed people believe that the punched card has really carved itself a permanent niche in American business. They are partly correct; cards will continue in use by medium sized companies just as manual systems have continued in use by small companies. However, it would appear to me that even these companies will find on the market in the very near future, tape handling electronic computers capable of handling their business transactions. These machines will have facilities for storing vast quantities of information with rapid access within the price range of their budgets. If these computers do not become available, service centers having large scale digital computers will supply the need for many of the smaller companies.

Punched cards are used to perform many of the day-to-day transactions in many American business offices. Statistical and accounting data are kept on punched cards. It takes a sizable sum of money to keep these records up-to-date. The machine rentals in our company, for example, are running over $1,000,000 a year. The cost of punched cards is around $125,000 per annum and involves 95 million cards a year. In addition, filing cabinets, rental of floor space, clerical cost and the like contribute to making record keeping a large part of our total expenses. These are items of expense that cannot be lightly ignored in our overall cost control program.

The present limitation of punched cards and relatively low speed of punched card equipment have made office organizations somewhat cumbersome to handle. A recent article pointed out that just before World War II, there were 11 clerks for every 100 industrial workers; today there are 16 clerks for every 100 industrial workers. Industrial production has increased 600 percent in the past fifty years and the industrial workers have increased only 80 percent in the same period. Clerical personnel have increased 400 percent during this period and now receive annual earnings of 25 billion dollars. To understand in part, and only in part, why this happened, let us look for a moment at the organization of a life insurance company. (What is true with us will apply generally to any clerical force.) In the main, we must recruit female high school graduates. On the average they stay with us a few years and then move on to other jobs and stations in life, the principal one being marriage. As a result of the heavy turnover, it is necessary to break the various jobs down into their simplest form so that training costs can be kept low. The job must be kept simple so that it will be possible to get actual production from the new clerks in a short period of time.

Variety of cards needed

In consequence of growth, it has been found advisable to functionalize the company organization. This has been necessary because present facilities of equipment are not fast enough to process our work in the required time and 80 to 90 holes in a punched card are not sufficient to carry all the information necessary on any given policy. The result has been that we use separate cards to handle specific information regarding different items that may affect a given policy. The company organization is set up correspondingly. In the case of our company, which is highly mechanized, the amount of information required to be maintained in punched cards is such that it requires in some instances as many as 25 cards per ordinary policy. If you take into consideration the large amount of information that must be used for identification purposes so that the cards can be brought together for any one policy, approximately one-third of all information is plain ordinary duplication. The further one studies the problem, the more one is convinced that some means must be devised so that all duplication of records can be eliminated and the means for processing the remaining data speeded up. You undoubtedly will ask yourself the same question I have—

> Is it necessary to get a new medium in place of punched cards for the storage of accounting and statistical data?

I have come to believe that the answer to the question is definitely "yes." There does not appear to be any way in which punched card equipment can be speeded up so that the work will be processed on the order of the micro-second and milli-second speeds of electronic devices. Punched cards just do not show up as an inexpensive method of record keeping in comparison with newer methods being introduced. Some method or methods must be devised to eliminate the human element to a much greater degree than is available with punched card equipment, if our office procedures are to be as efficient as the factory. The human element freed by digital computers from the monotonous detail of everyday business can be utilized to do more profitable and interesting work for the company.

Since 1946 great advances have been made in the general approach of electronic manufacturers attempting to make their equipment more practical for business use. Real progress has been made as indicated by the number of small, medium and large computers installed in business offices today. Most of these computers use tape as a means of input and output. The IBM 650 Data Processing machine at first used punched cards for input and output. However, it is my understanding that now magnetic tapes are available. Experience with magnetic tape—limited though it is—has given rise to the thought that record keeping in the future will be on magnetic tape or some other more efficient medium. The use of punched cards as both an intermediate memory storage and a means of input and output to computers has certain obvious advantages, but again, the speed of operation is seriously impaired. Also, the problem of space becomes of major consequence in this instance. It is possible for example, to store as much information on one

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Personnel

Problems and practices—1956

Many management executives are giving their primary attention these days to new developments in system planning, and office machines. That is natural; both fields are dynamic. Yet only the most short-sighted management will ever overlook the fact that basically an office is people, that, no matter what equipment it boasts, it will only work as efficiently as does its staff—

Older women whose children have grown up represent a pool of clerical skills which few offices are exploiting

Personnel -- past, present and future

Forecast for the future: Continued rise in salary levels; acceleration of trend toward increasing privileges, fringe benefits in the office

by Keith Lee

IN THIS ERA of continuing prosperity, and continuing high taxes, some of our finest old cliches are losing their force. It isn't true—as once it was—that the poor are always with us; it isn't even very certain that the rich are.

But in the world of the office, as against the world of society as a whole, values seem more stable. The personnel problem is *always* with us.

The problem itself may vary. But there's always a problem. Twenty years ago it was too many people for the available jobs. Today, it's too many jobs for the available people. That primary fact, leading as it does to competition between employers for the workers available has wrought a revolution in the relationship between employer and workers as profound in its way as the revolution which has occurred in the machines and the system concepts which are playing so large a role in office planning today.

The reasons for the continuing personnel pressures are easily found. Our present generation of young clerical workers are the "depression babies" of the 1929-1936 era when the birthrate was low. There is an actual shortage of people in the early twenties. Yet we are in a period of booming prosperity when there is an abundance of jobs. That factor alone creates a shortage of people for available jobs. The factor is complicated further by the lowering age at which people are marrying and starting families of their own these days. This causes a constant draining off from the office of the young women who have become the backbone of the nation's clerical forces.

Demand for services rising

This situation is further aggravated by the fact that the demand for the products of the office is continuing to rise in a sharp curve for which there is at present no end in sight.

The net result of these factors has been that personnel administration has become a more vital field than ever before. Good personnel practices have become a necessity in every progressive company.

The importance of personnel will continue to increase, in spite of the influence of automation on the office, according to most of the experts. The consensus definitely seems to be that automation will not cut down on the total number of people holding clerical jobs; at best, it will slow down the rate at which additional clerical staff must be added. But all agree on one effect the fast developing field of automation will have on the personnel function: it will make the proper selection and assignment of personnel to the right jobs a more significant function in office operation than ever before.

Thus, the major effect of the new concepts and machines that are changing so rapidly the entire picture of office operations as we have known them would seem to be to emphasize the importance of the personnel function. We can no longer afford to have round pegs in square holes. The consequences may be too serious. Moreover, the office will no longer be able to recruit en masse as it has so often done in the past.

Personnel recruitment must become a selective process, and personnel assignment a scientific one. Moreover, training will become a more important activity than ever before. The retention of trained personnel will also become more of a conscious competitive effort for management.

All of this implies another change

as sharp as the change that has come about in management-employee relationships in offices from the time when employees sought jobs to the present circumstances where companies seek—and woo—employees.

But it implies a change that must be more carefully planned than the past one in which companies have merely attempted to outdo each other in the benefits offered their employees. Some companies have created fairly elaborate training programs; many have improved immeasurably their selection procedures through use of such media as psychological and ability testing. Few, however, have devoted nearly the time and effort to basic personnel training that has been invested in the drive to obtain better management personnel.

Yet, under the impact of automation the skill and accuracy of clerical workers in the higher grades may conceivably become as important to the welfare of the company as the judgment and ability of the lower management grades. Automation, paradoxically, will probably bring about both a sharper distinction between office jobs, and a greater leveling off of responsibility in office jobs. The lowest paid clerical worker will to a degree be as vital to proper processing as the supervisor who has charge of the section in which he works.

This implies a host of things to alert company management. Obviously, ways and means of achieving greater selectivity in choosing and assigning employees is a subject which all companies should begin thinking about very carefully. Equally obviously, a tighter personnel control, a more scientific approach to promotions within the company, and to assignment of responsibilities within job classifications, are all among the consequences we may expect from automation.

But this increasingly formal approach to the organization of the office which the discipline of increasing automation will probably dictate will not mean a return to the rigid atmosphere which once characterized offices. The trend toward increasing salaries, increasing privileges, increasing fringe benefits in the office will undoubtedly continue.

As the people in our offices require greater initial cost in selection and assignment procedures, as they represent a heavier initial investment in training programs, it will become increasingly important that we make every effort possible to retain them. And that will mean, through the foreseeable future, that each company will be to a degree competitive with its fellows in offering personnel the kind of atmosphere and the kind of benefits that will hold them.

All of this implies a trend toward even greater specialization than we have had in the past, but that implication is not necessarily true. As the machines take on more and more of the routine work of the office, the purely human qualities of flexibility and intelligence among our clerical and managerial workers will become increasingly important.

The machines will be doing the standard work; our workers will be handling the work that does not fall into easily classified patterns, the work that demands human judgment, intelligence, the human ability to relate an individual operation to an overall goal.

And overspecialization does not develop these qualities.

Dual training required

Therefore, the intelligent personnel function is faced with the problem of training workers to control more intricate machines, while at the same time indoctrinating workers with knowledge of company-wide policies and objectives wide enough so they can make the right decisions when questions out of the normal routine arise.

In effect every worker will become a more important part of the company picture, take on a greater responsibility for the company's welfare. And that means that workers have to be imbued with that sense of responsibility, and given a background wide enough to let them make the right decisions for the company.

This in turn will make mandatory a double-barreled training approach, in which workers will, of course, be trained for their particular role within the company, but will also be given a wider orientation to the work of the whole company than has been customary.

This has been done for some time in some progressive companies mainly as a spur to worker morale and understanding of the importance of their own jobs. Now it will become imperative in most companies, not only for these solid reasons, but also because the companies' own progress will demand it.

This deliberate, planned reversal of the trend toward overspecialization which has characterized so many of our business training patterns in the past few decades is already seen on the management development levels. More and more leading companies are paying attention to the general educational background of candidates for advanced management posts. In some instances, companies are even sending junior executive levels to college courses, not in technical or business fields, but in the fields of the humanities and the liberal arts.

So even though machines impose more rigid demands on the office, the compensating factor is that the new needs of the office are for more fluidity among human beings, more adaptability, more general knowledge as well as a high degree of specialized knowledge.

These are the long-term trends that can be seen ahead, and, in many instances, are beginning to apply today. The increasing emphasis on making the office a pleasant place to work, the use of color, of music, the installation of recreational facilities, are all aimed at keeping morale high, keeping employees happy. The various employee communication devices—office-wide meetings, employee bulletins, and house organs, are first attempts to give the employee both a sense of participation in the company as a whole, and a picture of company operations as a whole.

This taking the employee into the company circle to the extent of catering even to his recreational needs, which some decry as paternalism, and some praise as a healthy breaking down of artificial barriers between various sections of the office, seems, whatever the merits of either argument, to be a continuing trend—one, which, whatever view the individual takes, must be adopted to some degree by every company.

We are living in an age of insecurity in many ways; the company that exploits the average worker's need for a center, for a focus of his activities, is in many ways deriving advantages from it today, and will continue to gain benefits from this

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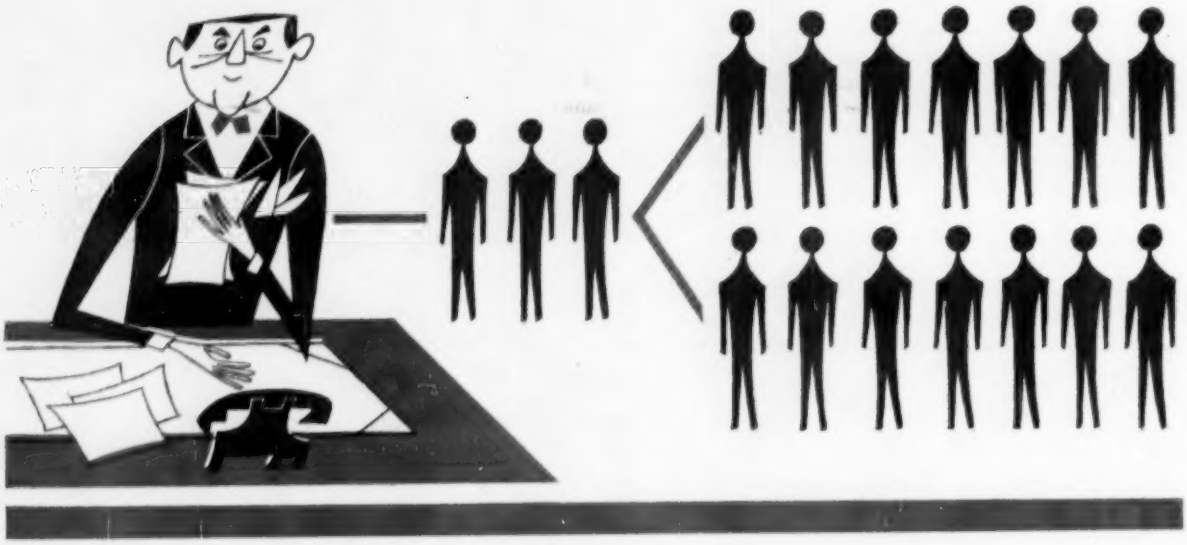


Outside experts are effective in instructing "trainers"; direct employee training is best accomplished by your own people

Good personnel direction means forceful selling

Today, many personnel administrators find themselves plagued by detail, lacking in status. Is it their own fault for underrating the importance of their function?

by Jules M. Graubard

Director of Employee Relations for Bache & Co., New York, the author formerly did personnel work for the Chase National Bank. He also acts as a consultant on executive development, human relations, supervisory training.

IT HAS BEEN my privilege to observe the techniques and evaluate the reports of several nationally known management consultants. Organization-conscious managements call in these specialists to examine their corporate health and prescribe the most recently developed miracle drugs. (True, some firms accept only the better tasting pills, and members of the staff often fail to understand why the boss had to pay the doctor when he could have had the same recommendations from the staff, but home remedies are not packaged as handsomely.) During a typical preliminary diagnosis of the organizational structure, the consultant usually asks management to outline its short and long term objectives, a query that often throws vice-presidents into temporary confusion. The fact is, most of us are so occupied with getting today's work out that we simply have no time to answer such basic questions. More to the point, these questions are more easily asked than answered.

As one who identifies himself with the personnel function, I am one of thousands who are busily occupied with the day's details, thereby avoiding, perhaps unconsciously, the difficult though vital task of taking time out to contemplate the answers to such questions as: "What are the objectives and goals of the personnel function", and just as important once these are defined: "What are some of the techniques personnel officers should employ to sell top management on the validity of our objectives and on the methods whereby these objectives may be implemented". The personnel function is one of many dynamic inter-relationships in organizational structures. Unless we assert our rights to administer this managerial responsibility, it will be absorbed by other officers and departments—to the point where the personnel department may be relegated to record keeping and such distasteful tasks as staff reduction and the easing out of inefficient employees with long periods of service. I fear that we in personnel sense the shrinking dimensions of our profession, yet, I, personally, can place the blame on no one but ourselves. Until such time as we define our objectives and take back the initiative from the organization chart box-grabbers, the comptrollers, the legal gymnasts, and the machine-oriented shop superintendents, the personnel officers will continue to deplore their present con-

dition, to become increasingly ineffectual, and to huddle together at occasional conventions and conferences, applauding generalities on the virtues and benefits of human relations in industry.

If we are justified in offering the criticism that we are preoccupied with detail rather than with planning and goals, then it should follow that we direct our attention to the more positive aspects of our managerial function. What are the recent developments and trends in the personnel field? May we cast a prophetic eye over the years ahead?

Preparing for automation

Viewing the short-term objectives first, it is well to prepare for the impact that automation will have upon the personnel function. The automation concept has won the imagination of all the men who prepare agendas for conferences, and your company will probably, either through necessity or vogue, begin explorations in the area. I, for one, fail to grasp the entire reason for the furor. Congress has already begun to investigate the implications of automation on the country's economy and labor market. I tend to see this as something less than a revolution. Automation is nothing new to America. What we have here is a renewed interest, sparked by the design and invention of electronic equipment over a short period of time. It will be a while before the electronics engineer and the industrialist learn to bridge the gap of application. We seem to have some highly technical and potentially adaptable equipment on one hand, and a pressing need for it in industry on the other hand. However, it takes a while before the scientist and machine designer know enough about your company to construct machine equipment capable of replacing many years of manual experience. Often the machine may only be capable of doing seventy percent of the work, which may necessitate the maintenance of a dual system at higher cost. Automated offices and factories are not imminent. What we seem to be doing is telescoping and accelerating a process which has been going on for some time.

What does this mean to the personnel department? If your firm is contemplating the application of automation to its particular needs, you had better prepare your employees for it at the incipient stages of the experiment. Although in the present economic climate your employees may have little to fear, nevertheless, they may be reluctant to ask questions for fear of being accused of impeding scientific progress—but be assured, they will have questions. Both management and the automation engineers should prepare meetings and materials to facilitate implementation. You, as a personnel officer, should formulate an approach to the age-old question of machines replacing men. Despite the fact that the engineers insist that employees will not be replaced, I have heard personnel directors raise the question as to whether automation will not require a new focus on proper selection. Those of us who have been through the process of converting a hand bookkeeping operation to a machine (IBM) accounting process recognize that we now need fewer bookkeepers and accountants and many more machine operators. In other words, we have gone from bookkeepers with relatively high clerical and numerical skills and long periods of training, to machine operators who can be trained quickly to perform repetitive, less intricate assignments. IBM installations begin to pay off when complicated processes can be replaced by a series of more simple and repetitive operations. One aim is to be able to employ larger numbers of less skilled help, thereby increasing the span of control for supervisors handling larger numbers of men in similar operations. The experience in IBM processes should be valuable in planning toward automation. In fact, in a limited sense, IBM accounting is automation.

It is doubtful whether automation can be approached without the consultant in this highly technical field. As a salesman, the consultant has an advantage over you and me in selling management. Few of us understand his product well enough to ask intelligent questions, and, even more important, he speaks the universal language of reduced operating costs—a topic of natural interest to management. But regardless of his advantageous position, the automation consultant will probably have little idea of your business in general, and your policies and procedures in particular. It is going to take him many, many man-hours to learn it, and he is going to adapt himself to your business vocabulary by drawing upon the time and talents of your busiest and most capable staff members. Most of the consulting fraternity will admit to this practice before you get an opportunity to observe it. You may be able to reduce some of this expensive training time by turning over to the con-

Don't speak *back* to the boss; but do speak *up* to him

sultant all relevant training materials, flow charts, policy manuals and even advertising brochures.

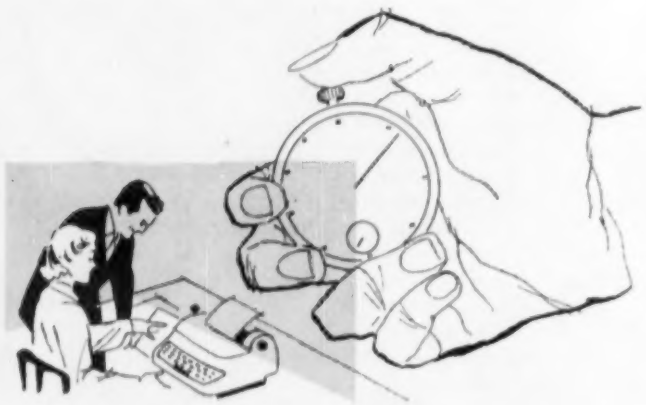
I am afraid that some of our confreres may favor automation for rather inauspicious reasons. If you have the recruitment problem to contend with in the search for skilled individuals whom you cannot attract because of your own salary structure, your firm may view automation as an expedient alternative to developing more equitable wage scales. If this is one of your fond hopes, it will be, at best, a temporary patchwork. The concept of working with inanimate machines rather than with sensitive, unpredictable people has always been attractive to those of us in management who have never learned our trade. However, I would like to observe that the field of personnel administration has traditionally attracted men and women who came into the field in search of the creative challenge and satisfaction of working with people—and not with tireless, inarticulate, unchanging automatons.

Whether or not you expect your firm to explore the wonders and promises of automation, employee training is now a function of management which requires little selling. More often than not it is merely a question of where to place the responsibility. Because of the lack of expert agreement as to where it belongs on the organizational chart, especially in the smaller company, there is a tendency to leave the decision vague. This often results in a diffused responsibility that everyone equally ignores, or it may be one of those loose balls which anyone with initiative can pick up and run with.

As the concept of training continues to gain general acceptance, it becomes more and more essential to formulate its organizational responsibilities. It is least effective when training is given over to the personnel department as an operating function. When this occurs department heads are apt to consider training as someone else's headache and disregard it completely. As they view it, they are too busy doing "real work"—overseeing production, increasing tangible earnings, and meeting deadlines; they have little time for non-productive activities. Personnel departments which have not been able to convince management of the need for a specialized training staff are loathe to take on the task themselves.

Supervisors must share training

Training is everyone's responsibility. Management must convince every operating department supervisor that training is just as much a part of his job as is production. The supervisor should be able to count on the personnel department for staff guidance, the preparation of training materials, proper training facilities, even training in pedagogical techniques; but wherever size will permit it, training will be accomplished more effectively when it is done by an individual department for its own people, tailored to its own needs. The largest companies, with the most specialized training departments and the most artistic flip charts, are not always the most effective. These mammoth undertakings, some equal in size and faculty to a fairly large college, can become so lumbering and structured that they find it difficult to process a new idea or to move readily with a new need.



An operating department head will often request personnel to supply him with only skilled employees. He will tell you he has no time to train, no room, and no instructors. Today the labor market works in your favor. There is no available pool of trained people. The department head must either absorb trainees or go without. Personnel can add weight to its argument by stressing the supervisor's accountability for costs, as well as for departmental planning and staffing. Lastly, just as children learn most quickly from parents, employees seem to absorb most effectively from their immediate supervisors. Outside experts can be effective in demonstrating techniques, in creating a craving for the subject, and in instructing trainers, but the training itself is best accomplished by your own people.

The role of the personnel administrator differs from most of the other staff functions in that his activities have more far-reaching implications. He is working in the past, the present, and the future. The recruiter whose selection tools are poor, who under- or over-hires, is obviously affecting the efficiency, the morale, and the cost structure of his firm for years to come. Many a company has on its staff one or more disgruntled employees who have somehow accumulated twenty-five years of service, but who should never have been hired in the first place, and once hired should have been released some twenty-four and one-half years ago. Somewhere along the line, someone either shirked or was not up to his decision-making responsibility. The personnel officer has to contend with the past as well as defend it. As he attempts to resolve a personal problem with an employee who has been with the company for ten years, he is faced with more than the problem at hand. In such instances, the employee brings into play every supervisory relationship and experience he has had with the firm from the day he joined it. Thus, the personnel framework and the morale structure which gradually evolve through the years, affect each and every present-day relationship.

What is being prophesied for the personnel function in the management structure? Is the personnel officer becoming a more integral part of top management? To hear some management writers, they would have

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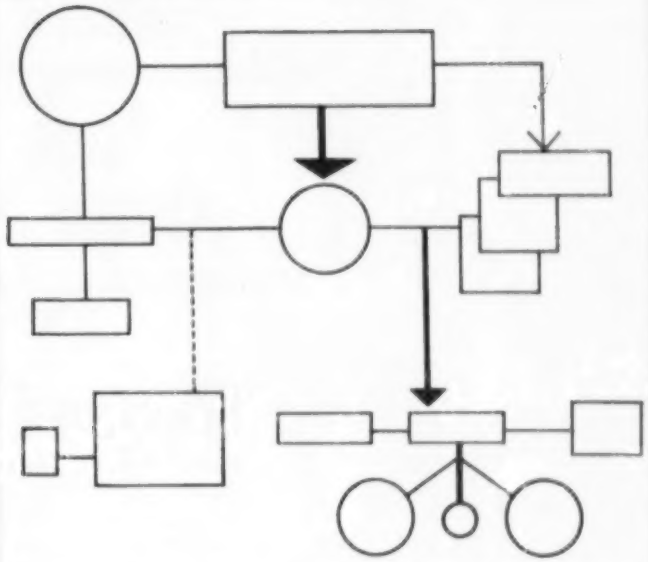
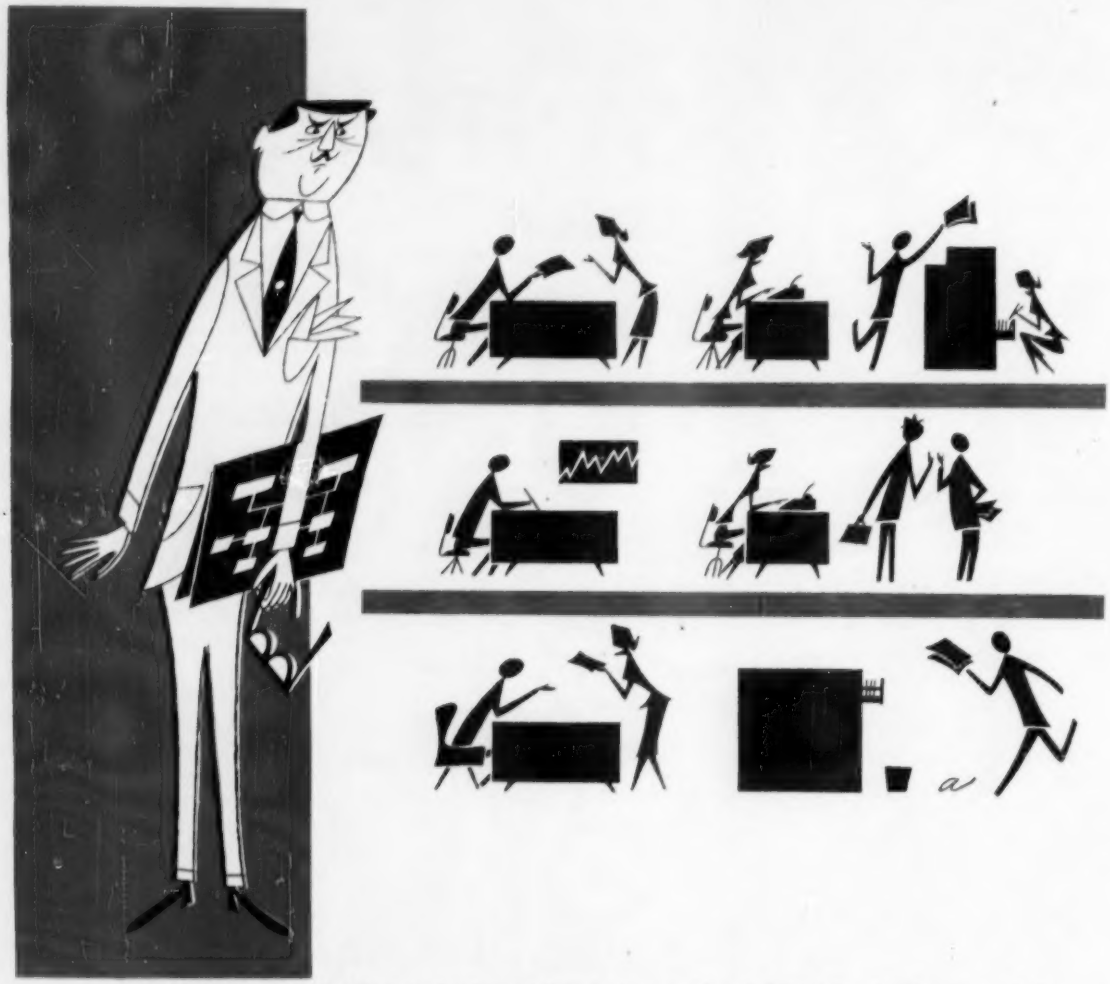
SYSTEMS
DESIGN



FORMS SIMPLIFICATION AND RECORDS MANAGEMENT

Fundamentals of a successful office

Systems design, planning all clerical activities as an entity, represents a solution to the most serious problem facing the office today: elimination of the inefficiencies and serious cost burden resulting from the past few decades' too hurried adaptation and expansion of traditional clerical services to meet new needs.



Analysis of the present system is fundamental to system revision; it is best for the planner to sit down with each worker in each department and determine what that worker actually does.

The seven essential steps in good systems design

by Ralph W. Fairbanks
Fairbanks Associates, Greenwich, Conn.

SYSTEMS DESIGN means different things to different people. To some it suggests work simplification, forms revision, the straightening out and elimination of a few repetitive work processes. To others it means the replacement of human operations by machine operations wherever that is feasible. To others still, (those who have had unfortunate experiences) systems design is a chimera, an elaborate phrase disguising an empty process of mumbo-jumbo that doesn't improve anything.

There is an element of truth in each of these views—even the last—yet each of them is actually a false picture of systems design simply because it represents only a part of the total. System design has meaning only when it is done as a whole; it must encompass all activities of an office, and balance each improvement made against general goals and objectives. It must, in other words, mesh individual improvements and changes in methods into an improvement and revision of the entire clerical work system.

Changes in individual methods, then, are not nearly as important as a basic streamlining, and simplification of the entire pattern by which the office accomplishes its work. This may involve mere overall refinement of existing systems, or it may imply a fairly complete revision of the entire work flow within a given office. In either case, it will, if carefully done, depend on certain basic steps. If these are taken, if they are carried through carefully by qualified people, the basic results of systems design will be good. It is only when these necessary essential steps are ignored, or are carried out in a slipshod and careless manner that the bad, and well-publicized systems breakdowns occur.

What are these steps? What is involved in each of them? Why is each

of them necessary to insure that the final system design created will be the best possible one for any given company?

Let's analyze each essential step in system design, and see the necessary role each plays in successful system planning. The first step in system design is analysis of the system you already have. No matter how sweeping the ultimate revisions of your present system, the only sound basis on which to plan them is a thorough knowledge of that present system. Only analysis of your present system can show just what needs your company has, right down to the individual uses individual departments within your company make of various items of information coming to them. Each routine flow of information may be changed in the eventual system created. But at least the system planner knows he must devise some alternate method for each department getting every bit of the information it needs to carry out its work. The only way to insure that every loose thread is caught up in the final system is by analysis of every move of every piece of paper in the present system, from its origin to its final disposition.

Analysis must be formal, thorough

And this analysis must be done formally and rigidly. It is not enough for the planner to "get the picture." He must have the present picture recorded in fairly minute detail—minute enough so that there are no loose ends whatever, there can be no chance that any present activity or work pattern has been forgotten or ignored.

This means that the planner should chart the work of every department in the company, and insure that every form, every report, every processing step that takes place within every department is accounted for both at its place of origin and through every precedent step that brings it to the department. Moreover, it must also be accounted for after it has passed through the department until its final disposition.

When this phase of his work is finished, the planner has for the first time a complete picture of all the clerical activities of the company. He can trace the movement of any routine piece of paper or any routine procedure through all its moves, superfluous and necessary, within and between the various parts of the office.

Analysis is basic for a number of reasons. It is only by such a thorough review as this that glaring inconsistencies in the present system can be exposed; it is only by this process that one can really see which moves of each bit of information are essential, which are completely superfluous. It is even possible that such a process as this will show that complete systems revision is not necessary after all, that streamlining and weeding out superfluous steps in the present system by which the office does its work will give adequate results. At least, even for purposes of creation of an entirely new system, it demonstrates the essential points which each work process must serve in the final system, if that system is to meet its objectives.

There are various ways of making this analysis. Some planners do it by discussing with each department head his department's work. Generally, though, it is much better for the planner to sit down with each worker in each department, and by observations and questions determine what that worker actually does during his working hours. The most conscientious department head is apt to forget some of the details of the routine work carried by his department, especially if those particular details are unimportant in his department's work. Yet those same "details" may be vital to the work of a subsequent department.

Moreover, it is important for a number of reasons that the same man or group which is to be responsible for planning the new system make the analysis of the old. Through his own analysis, the planner who is to design the ultimate system gets a much more intimate picture of the company, its way of doing things, and its general tenor than he ever could by studying another man's reports and flow charts.

Good flow charts record the movement of work within the company, and if they are accurate and meticulous, they can be used by a system planner other than the man who prepared them. However, the second planner can never have quite the same certainty in preparing his system design that he would have if he could depend on his own prepared charts.

The author, a frequent contributor to *Office Management*, acts as special consultant on office automation to the magazine.

The analysis phase completed, the planner is prepared to discuss with both departmental and top management the objectives which the new system should be designed to meet.

In effect, we set up the boundaries for our creation. We must know the specific objectives our system is to gain, as well as the general ones. We must know the most important activities of our office, and which areas of those activities it is most important we improve. We lay out our planning course by defining our major objectives first of all.

This sounds very simple, but it involves a little more than is apparent at first reading. For instance, systems revision ideally should cut costs, and raise productivity. Practically, it may in a given instance be possible to accomplish either, but not both. It thus becomes a question: which is the more vital: raised production or lowered costs.

It is only within the framework of quite definite objectives that the beginnings of a new systems pattern can be drawn. The objectives given the person responsible for planning the system become his benchmarks, the checkpoints by which he and management can gauge the effectiveness of his new system plan.

The third phase of system design is planning—the actual creative phase in which the general shape of the new system first materializes in the planner's mind.

The planner knows what the office is doing now to achieve a certain number of end products which it finds necessary. He knows from his flow charts how it is arriving at those end products, and what raw information it is using to create them. He knows the basic objectives both departmental and top management want from his new system. The needs of the office, and the specific products of the office are his basic materials. With them he must determine the simplest, straightest, least expensive path for raw data to follow to become a desired end product, insuring that necessary by-products are created from the raw information wherever they are required.

Start with end product

The planner first looks at each of the end products required by the particular office, and, considering the sources of information from which that product must be created, tries to imagine the various possible routes that information might take in order to reach the desired end. In effect he knows a departure point and he knows an eventual destination. What he must do is find the best and most direct route between those two points. He must do this for each of the various products required from the office.

To do this, the planner devises as many alternate methods of getting the work done as he can. The greater the variety of paths he has to choose from in his eventual weighing and reconciliation, the better the eventual system will generally be. For though there may be one obvious route for any bit of information to follow in order to become a primary end product, there are many subsidiary requirements of that information other than as primary end products.

Thus, there may be five different possible ways of processing a sales order visualized by the planner. One way may involve seven basic steps, another may involve eight. Yet the system that takes eight steps may offer the possibility of giving necessary by-product information from the sales order to departments other than those in the direct order processing line.

In other words, every bit of data used in the office must serve two purposes; it must move in a direct line toward the primary end result for which it is designed, and it must also flow off in horizontal pipelines for use as subsidiary information in other departments. A sales order is primarily used in sales, billing, accounting, and shipping but it also plays a vital part in sales analysis and forecasting.

It is the job of the systems planner then to find a pattern that offers the minimum number of steps for the primary processing of every bit of information and also satisfies all the essential by-product requirements of that information.

Here the flow charts which he has prepared of present processes are his guide and his guard. They make it possible for him at the system planning stage to see all the operations of the company as a whole, to insure that no necessary step, no necessary by-product use, is being forgotten in the general design he is creating.

This is the strategy phase of the attack on simplifying the work of the office, in other words, the creation of the grand design within which the individual machines and methods will ultimately be placed. It is the overall approach, which once determined, can dictate the thousand individual approaches. It is like a builder determining first the general shape and size of the building which he will construct, after which he will determine just how that building can be built most efficiently, just where he will put the individual rooms, the basic fixtures, etc.

In other words, the planner at this point allows his imagination free rein; he tries to visualize an ideal way of obtaining his end objectives, without too much regard as to whether the machines and methods that might make that ideal way work exist. He can search out possible machines and methods to put his principles into action at a later stage; at this point he is primarily concerned with finding what seems to him to be the ideal, the one best way.

When he has his principles for a new system established in this fashion, he moves on to the next step in system design—machine research, the search

for equipment that will allow him to put the grand design into real action.

He has his concepts. He knows basically what he wants to accomplish in each of the major areas of clerical work which are his first points of attack.

Now he checks the equipment needed. He does research on the available "hardware" which can be used to breathe life into his generalized concepts.

He looks for the tools which can be used to make his system work in the most efficient and economical way.

This may seem ridiculous to management; after all it is a systems planner's business to know what is available in the way of office machines; why should he have to do research at this stage of the game in system design to learn what units would be most useful?

It may seem ridiculous, but there is a firm basis of sense to the research phase. Every office is different. The basic principles by which two different offices work may be similar, but the individual methods, the individual emphases, the individual machines by which each office does its work will vary. Yet the planner, working in one office, may have had most of his experience with some machine group in a former office. That machine type may be less suitable in the present office than some other machine complex. Yet, without research, his automatic tendency will be to depend on the machines which have worked out well in earlier installations. Excellent there, those same machines may be a very poor second choice in the individual circumstances of the present job.

Therefore it behooves the careful planner to investigate the entire field of machines that might be usable in his systems plan with a fresh and unprejudiced eye, to balance the capacities and abilities of each machine, and each of the various types of machines, against the particular requirements of his general system, and the exact stresses to which that system may be subjected.

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As a good forms control program progresses, the department head should approve all new forms, but he can delegate to a responsible subordinate approval of routine changes on existing forms

Forms control gives cost control

Payroll is by far the greatest part of any office's expenses; payroll depends on the volume of paperwork. Every superfluous form raises payroll cost all along the line

by Frank M. Knox

ONE OF THE MOST DIFFICULT aspects of controlling costs in the office is for management and the entire organization to comprehend fully the important part that forms play in the program.

Forms are actually the raw material of paper work and are just as important in an office cost control program as is raw material in the factory to a product cost control program.

In the final analysis the office cost problem can be measured only in terms of payroll, usually clerical or salaried payroll. In other words, the salaries paid to the people who are engaged in paper work. This is the bulk of the overhead or burden factor which must be recovered in the selling price of the product.

Obviously, different people in the office are engaged to different degrees in paper work. The president works to a very great extent with information gained through paper work, but it would hardly be fair to charge any considerable proportion of the presidential salary to paperwork. On the other hand the salaries and contingent expenses of file clerks and the typing pool should be charged in their entirety to paperwork.

All of the administrative and supervisory payroll as well as the entire clerical payroll must be charged directly to the paperwork of the office. Only in terms of this payroll can the true cost of paperwork—in other words the use of forms—be measured in the office.

If a company has a clerical payroll

President of the Frank M. Knox Co., Cleveland and New York, the author is a consultant on the control and simplification of business forms and paperwork in the office He is the author of "How and Why of Payroll Records," and "The Design and Control of Business Forms." The latter is the first of the NOMA Management Series. During the war, Mr. Knox served as Director of Publications in the office of the Secretary of the Navy, directing what was probably the largest forms control program ever attempted.

of one million dollars a year and there are one thousand forms in the company, it is quite obvious, then, each form costs an average of one thousand dollars a year in terms of clerical payroll.

To be a little more specific, each time an average form is used someone picks it up, writes information on it, sends it to someone else who picks it up in turn and reads the information, possibly makes a computation or checks a figure, makes a decision or starts some further action, files it and possibly withdraws it at a later date for further reference.

Assume that all this takes only twenty-five minutes including non-productive time and an allowance for personal time during the work day. Experience shows that the average form is used under average conditions in a quantity of about two thousand copies per year.

That amounts to about fifty thousand minutes per copy or 833 payroll hours per year.

If the average pay per hour for all of the personnel working on the form (and many of them go to department heads or executives of the company) is $2.00 per hour that average form will cost the company $1,666 per year in payroll expense.

The important thing to remember here is that this expense accrues whether the form is produced cheaply by office duplicating machines or bought from commercial printers or whether it is a complex carbon interleaf form or a gratis form furnished by someone else to the company. The clerical expense is not avoided by cheapening the production process—more likely it is increased through the production of inefficient and badly designed forms which in turn become bad clerical tools.

Experience shows that the majority of the average company's forms are produced on office duplicating machines (the hectograph, the mimeograph and the offset duplicating machine) and that there is seldom any real control over the machines or what is produced on them. Control units are liable to call them "bootleg" forms and the using units are liable to look at them as an efficient method of keeping the wheels turning without having to wait two or three weeks while someone else produces or procures the form.

Another little recognized but significant fact about forms is that most of them are used in small quantities per year and, on the face of it, look quite insignificant. When a daily report is made up it amounts to only 250 or 300 copies per year and it is difficult to get the average department head excited over controlling those forms or others like them. Yet the cold hard fact remains that most of any company's total clerical expense is made up by the use of those comparatively small usage forms and if they are not controlled it will be impossible to control the expense of using them.

Many instances have been seen of the establishment of forms control programs under which significant reductions are reported in the total number of forms in the company but when two or three years later all the "bootleg" or office duplicated forms are uncovered that have come into existence unknown to the control unit, the total number of forms will be found to be as high or even higher than the original number.

No forms control plan can be effective unless office duplicating machines are controlled insofar as forms production is concerned. This does not mean that all office duplicating machines are to be taken away from the operating units. That is completely unrealistic since they are often needed in the operation of the unit entirely apart from the reproduction of forms. A realistic control of office duplicated forms can easily be established through two simple steps: first, establish a top limit of annual usage of a form beyond which none are to be reproduced by or on those machines except in emergency situations and second, make it mandatory that whenever forms are so produced, copies be sent to the forms control unit where control can be exercised to another reprinting of the form.

This amounts to control *after* the fact rather than *before* the fact but it is effective and practical and has the advantage of not hamstringing the operating units in their daily work.

But, it is repeated, forms and clerical costs will never be controlled unless *all* forms in the company office—duplicated and small usage as well as printed and large usage—are brought under control.

Effective forms control requires that every form be approved at a proper level in management before it is put into use. However, there is hardly a company, even those with supposed control over forms, in which forms do not creep in unknown to the control unit and many times unknown to anyone in management beyond the immediate supervisory level. Sometimes even the supervisor is not aware of their existence.

(If anyone at this point is inclined to say "Well, they couldn't be very important if that were the case" let him figure the clerical payroll expense contingent upon their use.)

Since under good management the forms control unit cannot have any final authority over forms, merely responsibility for their control, it devolves upon management to appoint someone in each proper operating area to assume that authority and to assume a joint responsibility with the forms control unit for their existence, design and use.

Since it is actually the indirect expense of the company, that is, clerical and paper work cost, that is being controlled, it seems obvious that the approval of forms should be on a fairly high executive level—probably the level of the department head.

But the department head is a very busy man and more and more as a control plan progresses and gets "over the hump", forms problems will be concerned with progressively smaller detail, excepting of course on major procedural changes.

So, it would seem logical that the department head would reserve to himself the approval of all new forms and major procedural changes, delegating to a responsible subordinate the approval of all routine changes on existing forms.

This however assumes that all existing forms have been examined and their existence approved in the first place. Unfortunately this assumption is too often completely wrong.

The matter must be remedied by a programed review of all existing

forms for validity and this should be done by functional groups. A good starting point is on the forms reporting information or data about all subjects and all operations. These report forms ordinarily will include anywhere from twenty-five to forty per cent of the forms in the company and can be instantly identified and located through a properly built functional index.

In reviewing report forms a special questionnaire should be prepared to go with the report form to those who make out the report asking pertinent questions about its existence, why it was created, how much time is involved in making the report out, who gets copies of it, and any other data which may bear upon its existence. Comments should also be asked about the report.

After this questionnaire has been filled out the same report must be sent with another questionnaire to those who ordinarily receive it asking other pertinent questions about the end use of the data. Questions should include whether or not the data are being used at all, if so, what they are being used for, whether or not less information could fill the bill, whether the report should be completely eliminated, reduced in size, put out less frequently, or in fewer copies.

After these questionnaires have been filled out they should be reviewed at the local management level for proper action. After this all of the questionnaires together with the report of local action should be reviewed again on a higher management level.

This type of study usually shows that probably 10 per cent of all the reports can be eliminated in their entirety together with the clerical operations contingent upon their preparation and use. Other reports can be reduced in frequency, or number of copies, or content, with a very material saving in total clerical expense.

After this type of review by functional use has been made of all forms in the company, the department head can take for granted the validity of all forms in his department and safely delegate the responsibility for approving the majority of changes on existing forms.

It is not the purpose of this article to deal in detail with the entire office forms problem since that subject has been dealt with at length in the "Design and Control of Business Forms" by the author (NOMA-McGraw-Hill). However a brief review of the steps necessary to the establishment of a forms control program can be covered insofar as they refer to the setting up of an overall clerical cost program in the office.

The first step in the control over forms is to collect together samples of each and every form in the company, including all small usage, unnumbered and office duplicated forms as well as the large printed and better known forms. This collection usually reveals anywhere from 50 per cent to 100 per cent more forms than anyone in management knows about; if this condition prevails it is vital that it be revealed since every one of those forms contributes to office expense and enters into clerical operations.

No attempt should be made in this collection of samples to gather information as to how the forms are used but merely to find out who uses them and how many are used annually.

It is a great temptation at this stage to gather the procedural data contingent upon the use of the forms but there are several reasons why it should not be done. In the first place most workers actually cannot tell with any considerable degree of accuracy just what it is that they do in their daily tasks insofar as detail is concerned; second, it will take much too much of their time trying to put it down and will create hostility and third, the detail of what they do with the forms will be covered with complete accuracy in the later stages of procedures analysis in any effective office cost control program.

"Bootleg" forms are a serious waste

When the forms have been collected they should be built into two control files, a simple numerical file and a functional index. The latter is most important. In it all forms are classified according to the subject to which they pertain, the operation which takes place in their use, and the function involved.

Many traditional names of forms must be cast aside in this classification and meaningful terms substituted. An example is seen in the case of a bank check. From a procedural or use standpoint the signing of a check in effect orders a bank to pay off cash or its equivalent. Therefore the bank check will be classified under the subject "Cash," the operation "payment of," and the function "to order". This is a meaningful classification and relates the forms to the actual factors involved in its use in procedural and clerical operation.

Other instances of confusion in terminology which must be clarified in the functional index are seen in such forms as an insurance premium which in actuality is nothing but a statement and notifies the policy holder of the status of an account receivable; also a bill of lading which is actually a receipt insofar as the first sheet is concerned and must be filed under the acknowledgement of the receipt of materials or products.

In the building of the functional index all forms related to the function "to report" are identified and can in-

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The new approach to records management

1955 saw shift in records management emphasis from transfer and disposal of office records to tighter management of *current* files

by Emmett J. Leahy

IN A MODERN VARIATION of Gresham's law, "cheap" office records in nine or twelve copies, continue to replace sound office records. Nowadays solid documentation, the complete record of each business transaction in the one best location accessible to all, is as rare as a Molotov smile.

In 1955, as in preceding years, the overproduction, handling and filing of office papers continued to soar. Of course we have grown in size abreast of the highest wave of national prosperity the world has ever experienced. Our new size justifies billions of documents. But we have piled up more than a trillion in our nation's offices. And the United States Government alone has 50 billion.

This tide of paperwork continues to rise despite substantial business budgets for outside consultants, systems staffs, records management specialists, work simplification programs and forms control projects.

President of Leahy and Co., management consulting firm, and also Leahy Business Archives, Inc., which maintains low cost records storage centers in three states, the author was director of office methods in the Navy during the war. In 1948, he founded the first Records Management Training Center at New York University. He has served as a task force chairman on both Hoover Commissions.

Further, this rising tide of papers is swelled by, rather than stemmed by, increasing investments in office machines. Inherent in mechanizing the office as well as the factory is breaking the job down into standard parts that a machine can process. The single page of the old journal which once held 30 entries is now broken down into more than 30 punched cards or vouchers. So our mass of office records increases, and more geometrically than arithmetically.

Electronics won't solve problem

Harassed top managements are now grasping eagerly for relief in the promise of electronic brains. But in a forecast for 1955, Charles Chase, then president of the Systems and Procedures Association, and a valued associate of our Task Force on Paperwork Management of the Hoover Commission, passed along this caution: Electronic machines will undoubtedly do many office chores better, but will increase rather than decrease our paperwork and our office staffs. We will have to make new and additional records to enable these machines to "read," remember and use as a basis for reports.

We have yet to bridge a yawning gap. It gapes between the electronic technicians beguiled by the great capacities of their equipment and the office systems specialists sobered by cost limitations in processing thousands of transactions low in unit value and in themselves non-productive. The latter recognize that there are more limits to marking up office costs than there are to marking up manufacturing costs.

The great pipeline companies can transport a gallon of oil over a thousand miles for one penny. The merchant fleet can carry a gallon of oil from Texas to Maine for a penny. But our firm's research staff first found, for example, that it costs all companies, oil and shipping included, one to four cents annually to maintain one piece of paper in their office files. And each office has millions of such papers in its files. Which penny spent is the more productive?

Digging deeper into unit costs in the office, our staff also finds that companies spend a little over a penny for each standard five letter word or five digit number in each office report. This includes, of course, the reports on the gallon of oil transported more than a thousand miles for a penny. The accompanying table (Figure 1, opposite page) prepared by our firm and Seaman and Company as a contribution to the Hoover Commission, for the first time pins down this disproportionately high unit cost in the office. It applies to the trillions of words and numbers in the millions of reports ground out by our offices each year.

An office clerk originates a form, a report or a new copy and automatically files the thousands of papers that come his way. Only an executive decision can discontinue the form, the report or the overfiling. One can hardly deny that it should be the other way around.

No company could survive if its factories mass produced goods without any regard to sales. Control of factory buying, inventory and production translates the decisions of the sales executives and top management into plant operations.

But in our offices where work unit costs are disproportionately high, there are few such controls as we find in our plants. Top management rarely has a part in the start of a form, a report, a new tenth, eleventh or twelfth copy or new filing of the product. Middle management seldom measures the degree of need for the new form or copy against the total cost of processing, handling and filing.

Our consultants when called in by a client have yet to find an existing inventory of a company's paperwork. Thanks to the spread of records management and forms control, we now are beginning to find some inventories of records and of forms.

But no company has approached the

problem in the depth and to the degree of success of the recent Hoover Commission. And the Commission's problem was much more massive: (1) the paperwork within the entire Federal Government with its 2,300,000 employees, and (2) paperwork required of industry by scores of government agencies.

The Hoover Commission successfully broke new ground. "Must" reading for anyone interested in management in the office are the two reports of the Commission's Task Force on Paperwork Management. These are obtainable from the Government Printing Office in Washington, D. C. for fifty-five cents. Special summaries of the Commission's reports can be obtained from Leahy and Company, 337 West 27th Street, New York, New York, at no cost.

With the turn of the new year, can we report any significant and encouraging trends or developments? If we distinguish between significant developments as against gimmicks or fashions in the office, the answer is "Yes." But in passing we must note that our offices are as vulnerable to gimmicks or fashions as are our girls and our do-it-yourself fans.

On the broadest scale, the Hoover Commission's recent projects on Paperwork Management are most noteworthy. They represent something new in the manner of approach, depth of study and volume of results. For these reasons they will profoundly influence the course of management in our business and government offices for the next decade.

Paperwork Management itself is a new concept and a new phrase in the lexicon of the office. Here it is fitting to salute the United States Navy, and its Office Methods Division under the able direction of Edmund D. Dwyer, where Paperwork Management was first developed and, in 1954, so named.

Also on a broad scale, the impact of electronics is already discernible in the office. With the exception of some highly complex and technical computations, however, few electronic installations have thus far wholly taken over any large scale office routine.

But seldom in the history of the office has so much talent been assigned to investigate and plan the possible applications of electronics to our burden of paperwork. Consulting firms such as ours add electronic specialists to our staffs to protect our clients against premature or unnecessary investments as well as guide them in this new development. An important by-product has turned up in many offices and is as readily available in many more. One of the best accounts is by Les Matthies writing in the Systems and Procedures Association's Los Angeles Newsletter, *La Span*:

"The system man knows that wherever an automation system has been installed it was necessary to clean up the current system before it could ever be put onto a machine.

"Systems men have discovered that 50 percent or more of the savings that could be achieved through the machine are achieved *before* the machine ever comes in the door.

"What does this mean? It means that the average system is so poorly defined, that it can only work because

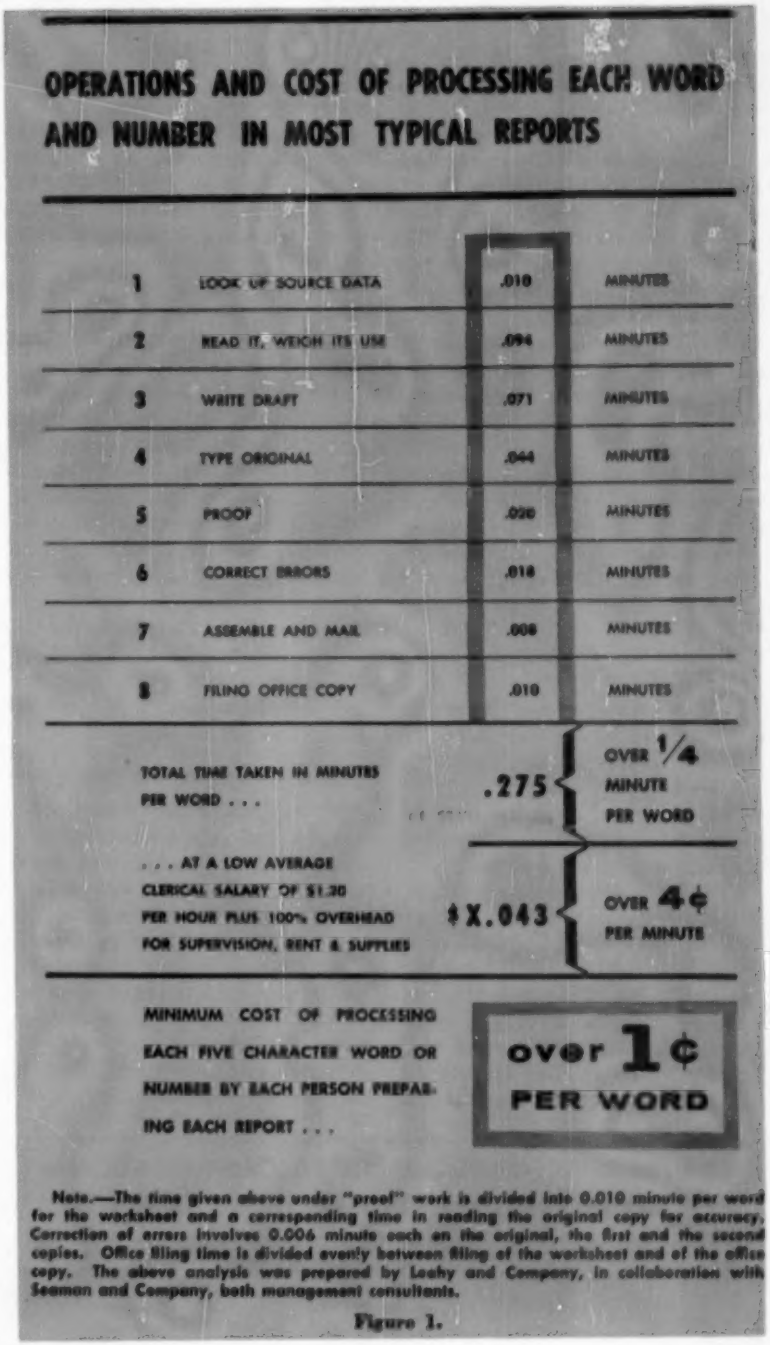

OPERATIONS AND COST OF PROCESSING EACH WORD AND NUMBER IN MOST TYPICAL REPORTS
1 LOOK UP SOURCE DATA .010 MINUTES
2 READ IT, WEIGH ITS USE .094 MINUTES
3 WRITE DRAFT .071 MINUTES
4 TYPE ORIGINAL .044 MINUTES
5 PROOF .026 MINUTES
6 CORRECT ERRORS .018 MINUTES
7 ASSEMBLE AND MAIL .008 MINUTES
8 FILING OFFICE COPY .010 MINUTES
TOTAL TIME TAKEN IN MINUTES PER WORD . . . .275 OVER 1/4 MINUTE PER WORD
. . . AT A LOW AVERAGE CLERICAL SALARY OF $1.30 PER HOUR PLUS 100% OVERHEAD FOR SUPERVISION, RENT & SUPPLIES $X.043 OVER 4¢ PER MINUTE
MINIMUM COST OF PROCESSING EACH FIVE CHARACTER WORD OR NUMBER BY EACH PERSON PREPARING EACH REPORT . . . over 1¢ PER WORD
Note.—The time given above under "proof" work is divided into 0.010 minute per word for the worksheet and a corresponding time in reading the original copy for accuracy. Correction of errors involves 0.006 minute each on the original, the first and the second copies. Office filing time is divided evenly between filing of the worksheet and of the office copy. The above analysis was prepared by Leahy and Company, in collaboration with Seaman and Company, both management consultants.

Figure 1.

it gets a constant application of human intelligence. If you offered such a mess to the electronic moron known as a 'giant brain' he'd grind up all his resistors in automative anguish."

Two recent cases where clients have retained our staff to prepare their paperwork and records for eventual electronic installations verify Matthies' point. In both instances over 60 per cent of the millions of data being processed was voluntarily eliminated. The supposed need for an electronic installation was eliminated in one instance. Here we have an exact measure of the pure "mush" in our paperwork and record keeping.

A Task Force of the first Hoover Commission in 1948 focused industry's attention for the first time on a then new concept called records management. One of our findings on that project was most widely quoted—that of all records:

1. Thirty-five per cent can be destroyed.
2. More than thirty per cent can be transferred to low-cost storage.
3. Over thirty per cent should remain in office space.

Only a handful of readers were intrigued by the fact that the figures did not add up to 100 per cent.

By 1955 most companies included, and many featured, records management in their methods improvement programs. The Federal Government continued to be outstanding. Herbert E. Angel, Director of Records Management, National Archives and Records Service, spearheaded the program throughout the vast reaches of the government. Late in 1955 he received the Civil Service League's new award for outstanding performance in the career service. The League in its award singled out this brilliant follow-through by Angel and his staff on the 1948 recommendations of our Task Force of the first Hoover Commission. Mr. Angel was a member of that Task Force.

The box score on this performance reported by the General Services Administration in 1955 is shown in Figure 2, below.

Seldom if ever have such large scale forecasts of savings been realized so accurately. As effective proportionately, however, are the results obtained by such diverse organizations as the New York, New Haven & Hartford Railroad, the City of Newark, International Paper Company, The New York Stock Exchange, the State of Michigan, Allied Chemical & Dye, and Florida Power and Light Company, among others with which members of our firm have worked and therefore have first-hand knowledge.

'55 trend accented current files

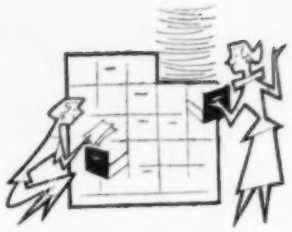
A most significant 1955 trend in records management shifts a seven-year emphasis on transfer and disposal of office records. The new emphasis is on organization and management of current files throughout an organization. The results are more tangible and greater than the solid returns heretofore racked up through transfer and disposal of office records.

Our surveys in 1954-1955 reveal that this new emphasis on management of

SAVINGS ACCOMPLISHED BY RECOMMENDATIONS OF THE FIRST HOOVER COMMISSION'S TASK FORCE

	Estimated 1952-'53	Actual 1952-'53
Records Disposal	$9,500,000	$11,500,000
Transfer to Low Cost Storage	6,500,000	8,227,000
Filing & Paperwork	16,000,000	14,443,000
	32,000,000	34,170,000

Figure 2.



current files obsoletes the 1941-1953 models in records management, good as these fine old equivalents of the Model T's were.

In the two largest single organizations in the country, reduction of files and record holdings match the great mass of new papers created. Working with the Army and the Air Force in 1955 we have found solid proof on a massive scale that the rising tide of papers can be and has been stemmed.

Pioneering this new penetration of records management into our record keeping problems is Ollon D. McCool, Chief, Records Administration Branch, Adjutant General's Office, Department of the Army.

Following McCool closely in the management of current files on a very large scale is William Muller, Air Force Records Management Officer. Further, Mr. Muller has attempted with initial success a single comprehensive filing plan for all units of our huge Air Force.

The programs McCool and Muller developed with steadily increasing results over a ten-year period have resulted in the elimination of over 60 per cent of all Army and Air Force files. Eighty per cent of the files eliminated were office files and not storage files.

Apply the following percentages to more than thirty billion records filed by the Army and the Air Force over a ten year period, and you have a measure of this significant shift in emphasis. Here is the before and after picture in official statistics:

Army-Air Force, 1944-1946

Records Destroyed	Records Transferred	Remaining in Current Files
37.3%	24.2%	38.5%

Army-Air Force, 1945-1955

Records Destroyed	Records Transferred	Remaining in Current Files
57.5%	16.9%	25.6%

If the reader has difficulty grasping such large scale figures, he might

(*To page* 190)

" . . . any simple, basic repetitive office task can be mechanized to a degree. . . . "

(*From page* 30)

This is not to say that the planner makes his final decisions about machines at this stage. He does not. He investigates the uses of all the machines that may conceivably play a significant role in his final system design, and records their various capacities and abilities for final judgment and selection at the point where he works out the individual methods by which his systems will operate. This is still a preparatory phase only, but it gives him a body of formal, fresh knowledge which can guide him in the subsequent steps of detailed system designing.

For when it is remembered what a variety of tasks can now be performed by various office machines, it becomes apparent that any simple, basic repetitive office task can be mechanized to a degree. Moreover, it can be mechanized very often in a variety of different ways. Almost always, too, the machines used in any one method of mechanization are made by more than one manufacturer.

Why research is essential

It is only by exhaustive research into the specific advantages and disadvantages of each type of machine, and beyond that, into the specifics of each make of machine in an individual category, that a planner can be sure when he finally designs his system step by step of being able to fit in at each point the best possible machine for use at that point.

This phase of assessing the available hardware completed, the planner is at last ready to move into the final stages of system design, the actual laying out of the specific steps by which his system will take shape.

Here he reverts to the same type of process with which he started the whole program of system design; he charts again the steps by which his new system will be achieved.

These new charts are at first only the roughest type of pictures of the work flow, they show the departure point and the end result and the major procedural steps in between. The details are still not clear. But the very act of creating the charts makes the total picture clearer. Several alternative minor procedures may be tied into any one major processing sequence as possible choices. Each of these minor sequences is then equated against the others in terms of the necessary end product, and of office needs and objectives as a whole.

And, as he creates the new rough flow charts, which he refines in a series of improvements into the final flow charts detailing his system, the planner constantly checks against the original geo-operational charts showing the work pattern under the old system. Thus, he has a continual check during this creative process to insure that no necessary step, no essential by-product use of any bit of data has been forgotten.

As he outlines in first rough form the alternative methods which will eventually be narrowed down into the one best method for every step in his system, the planner keys in the various machines which might be incorporated in the different ways of doing things. Detailed notes showing the varying abilities, the advantages, and drawbacks of each machine, are incorporated in the charts.

Thus he has in effect not only alternative methods of doing the job, but alternative machines to carry out each of the steps in each of the alternative methods. He can thus make an instant comparison of the relative advantages and disadvantages of each machine and each method of doing the work in terms of his overall system pattern.

When these first complete rough charts with the double levels of method and machine alternatives are completed, the planner has a very general picture of his ultimate system. Although it is general, it is fairly complete—somewhere within the various different routes he has mapped out for achieving each of his goals is the route he will eventually select as the best one.

Now the whole process settles down into a point-by-point comparison of each step in the sequence, a balance and weighing of each factor involved to try to arrive at the best possible method. Through a process of comparison and elimination, the "one best way" is found for carrying out each sequence of actions. The choice is made in two frames of reference; the needs of the immediate area in which the step is taking place, and the needs of the other areas connected with it.

When this process has been completed for all the work sequences embodied in the overall system design, the planner has achieved his ultimate system pattern.

Back to the flow charts

Now he returns again to the flow charts describing each of his selected procedures, and begins a similar comparison of each of the various alternative machines he has keyed into those charts. Here, again, he must refer back in a constant cross check against his original flow charts describing volume and cost figures for each basic processing stage, and balance his choice of machines against these figures. Two different machines may each be capable of doing the particular job he wishes done at one point. But the peak capacity of each machine may differ. The first machine may be adequate for the normal work load, but its capacity may not allow enough leeway for unusually heavy work loads. The second machine may be a little more expensive initially, but its capacity may give a safe margin for any conceivable load the process may be required to carry.

The second machine is the better choice. The choice of machines thus reduces to the same process of comparison, and continued elimination of alternatives that was accomplished first in various work sequences.

This work completed, the planner has reduced to major steps all the operating sequences of his system. He knows what machines will be employed in the operating sequence. He now proceeds to spell out the details, to flesh out the skeleton he has created. The rough charts describing the particular procedures he has selected are polished, and the details filled in, on much more precise geo-operational work flow charts—charts meticulous enough to account for every step in the various office processing operations, show every form used, trace the

progress of every paper, and every bit of routine operating data.

These charts must be this detailed because these are the charts which the system planner will present to management for the final verdict on the proposed new system. They must be exact enough in every detail to meet any possible management criticism or question. They must show in graphic form exactly how the office work flow will proceed if the new system is instituted. Thus, the various work steps are not only shown graphically on the flow charts. Each step is keyed with a number. A text page accompanying each flow chart describes in some detail the operation represented by each number. Similarly, the point of origin of every form and report is shown, as well as the path it takes from that point of origin. Samples of each type of form and report called for under the system are also shown.

These final flow charts, in other words, are detailed enough so that a stranger, totally unfamiliar with the particular office's operations, would be able to trace the progress of any paper or any bit of data through all the steps it would take in that office under the new system.

This detail is necessary, first of all for the planner's protection, and ultimately for management's protection. Management has a duty to be as critical and sharp-eyed as possible in finding flaws or omissions in the proposed system. After all, it is the company which will ultimately pay for any flaws or oversights after the system is adopted. The intelligent planner will recognize this duty of management. He will try, not only for his own sake, but for the sake of acceptance of his proposed system, to insure that every possible objection is anticipated, and that every step is shown in sufficient detail on the flow charts he will present to department management criticism, so there can be no possible ambiguity in management understanding of what is proposed.

The good planner must make sure before presenting his proposed new system to management that it will meet a dozen different tests. Under ideal circumstances, it should demonstrably be able to produce more work for less money than the company's former system; under any circumstances, it must clearly be able to produce the same work output for lower costs, or a higher work output at the same costs as the old system.

In order to make sure of this, the planner must be able to cite cost figures and work output figures when he presents his proposed system to management.

This is in many ways the most crucial point in systems design. It is often desirable for a management to institute a new system which will give it increased work volume at a small increase in costs. It is very seldom desirable for a management to institute a new system which will cost it considerably more than its present system, even if work volume rises under the new system, unless the company's business is expanding so fast that a new and more efficient system is absolutely mandatory.

Thus if the new system is going to be vastly more expensive than the old in the average company, that company is going to take one look at the system, nod approvingly at its ingenuity, file it away, and continue as before.

Determining in advance what the new system will cost *after* it has been put in operation is therefore of the most vital importance in determining whether a company should adopt it. Yet how is management—or the planner—to determine, in advance, what a completely new system will cost in operation?

It can't be done—precisely.

It can be done within an area—an area of expense which will be close enough to actual costs for management to determine the general range of savings it might expect from the new system as against the old.

There is nothing magic about the manner in which it can be done. It demands only care, caution, a grain of pessimism, and accuracy. Yet it is in exactly this area: failing to take proper measures to determine in advance whether a proposed new system is going to prove economical or ruinously expensive that so many companies today find they have jumped from the clerical frying pan into the budgetary fire.

How can predictions be made so that a company will know with a degree of certainty the approximate savings it may expect under a complete system changeover?

Again the cost predictions are a joint responsibility of planner and management. The planner must prepare the figures. Management must inspect each of his figures with a jaundiced, even suspicious, eye, so that any natural predilection a planner may have to show his system in a more favorable light economically than it deserves will be exposed.

The planner, in preparing his figures returns to the flow charts which are the maps by which he has guided so much of his thinking. In his original analysis of the company's clerical operations, he has keyed in cost and volume figures for each department under the old system. These cost and volume figures have been taken for a year which management has agreed is typical of company operations.

In the new flow charts which the planner has prepared to show the work flow of his proposed system, the text pages describing each operation shown on the charts, also carry columns for "Annual Volume," "Rate per Hour," "Machine Hours," and "Man Hours."

In these columns, the planner first keys in under the "Annual Volume" column the volume figure for the corresponding operation for the selected base year. Now it is a question of projecting this selected volume figure through the various costs implied in the new way of doing things to learn how much the new system will cost to perform the same volume of work.

These projected figures of course can never be exact, but the planner makes them as precise as he can, erring on the side of pessimism concerning the new system whenever there is a reasonable doubt. Thus, there is no particular difficulty in fig-

(*To page* 175)

". . . many companies have jumped from the clerical frying pan into the budgetary fire."

OFFICE LAYOUT and FURNISHINGS

The place we work in

Basic to everything the office does is the environment in which its people function. Personnel can be no more efficient than the conditions under which they work—and these conditions are influenced just as much by the physical circumstances of comfortable, pleasing surroundings, and proper space, as they are by liberal and intelligent personnel policies

A pioneer in the field of scientific space planning for offices, Mr. Ripnen is credited with many of the advances made in this relatively new field. He has been a frequent contributor to *Office Management* on the subject of proper space standards for offices.

How to plan space for the modern office

Today's architect must be a "space doctor" as well, prescribing the proper space allotments for the office's varied needs and problems . . .

by Kenneth H. Ripnen
Kenneth H. Ripnen Company, Inc., New York

BEHIND any office construction project is the architect, in the role of space doctor, participating in the analysis of office needs and problems, the discussion of their solution, and in all the preliminaries and follow-up right through to the finished office, and in many cases, involving the arrangements, made well in advance, for the actual moving of the personnel to the new location, co-ordinated carefully with company work schedules. Behind the scenes problems such as these are as much a part of today's architect's obligations to his client as his fulfillment of specific drawing standards are.

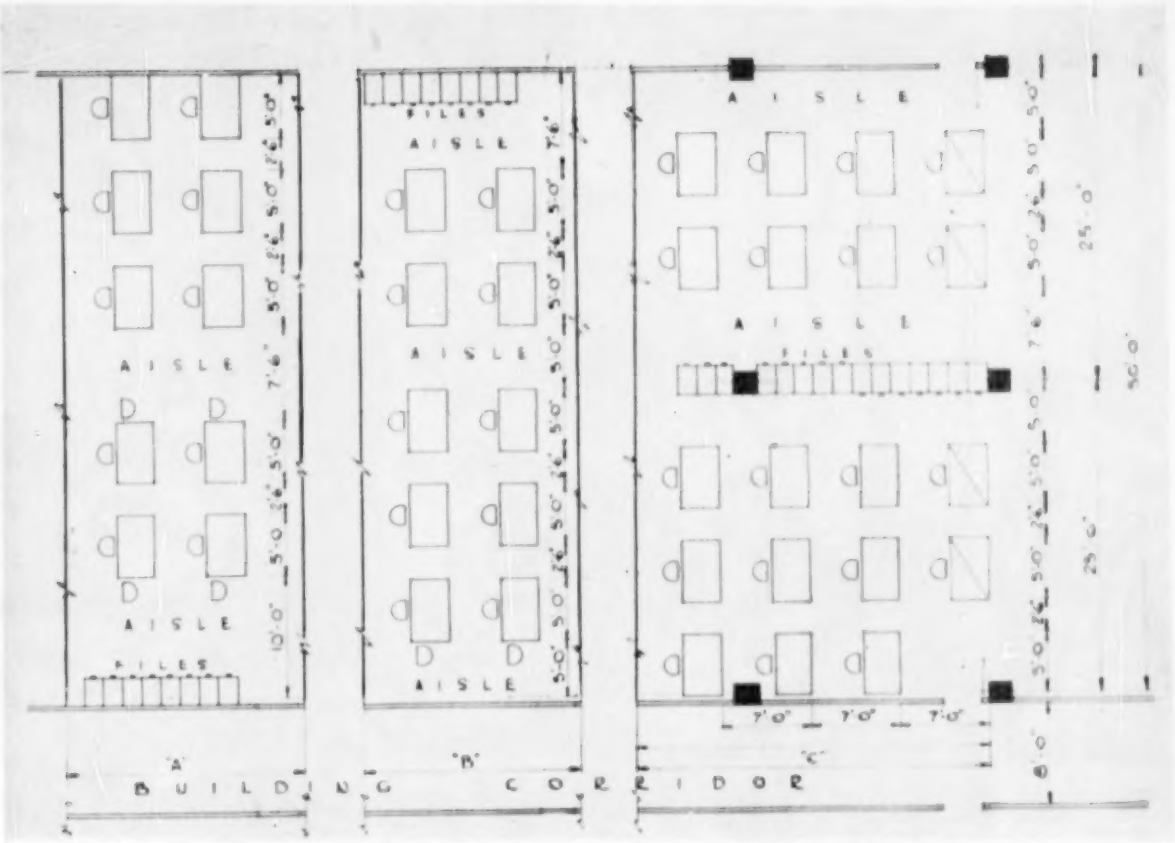
The architect must consult with his client at great length regarding such points as location of the new building, terrain, conformity to other neighboring buildings, exits and entrances for employee parking places, and many others. The amenities within today's offices are very much a part of any firm's personnel relations program, and the architect is cognizant of this important fact. His work in the office has most definitely to take this into consideration. He is conscious of color —colors best for certain people doing certain types of work—color for comfort and color for esthetic, decorative purposes. Long before we get to the relatively few things that the general public associates the architect with, he has had to give careful consideration to scores of important standards, trends, and principles which have a bearing on the efficient functioning of the modern office.

And he has to arrange, moreover, not just for current and readily anticipated needs, but for the expansion and changes that the day-after-tomorrow will bring. Serious consideration must be given to new space standards and the necessary amount of space for best office comfort.

The coming of automation is vastly influencing work load and work direction, and inevitably, of course, office layout and design. Electronic brains and automatic machines of all kinds create new problems. New lighting, acoustical planning, underfloor ducts, and color for special areas are now important considerations to cope with.

Let us start with the most important element of space, since renting today is $5.00 to $10.00 per square foot and building construction costs are $20.00 to $40.00 per square foot.

Basic in office layout are standards for space. Every architect discovers that clients have varying ideas as to what constitutes the best-sized areas for executives of different gradation and for general office use, and it is the architect's responsibility to harmonize these individual ideas with generally established space standards before his recommendations are presented for approval.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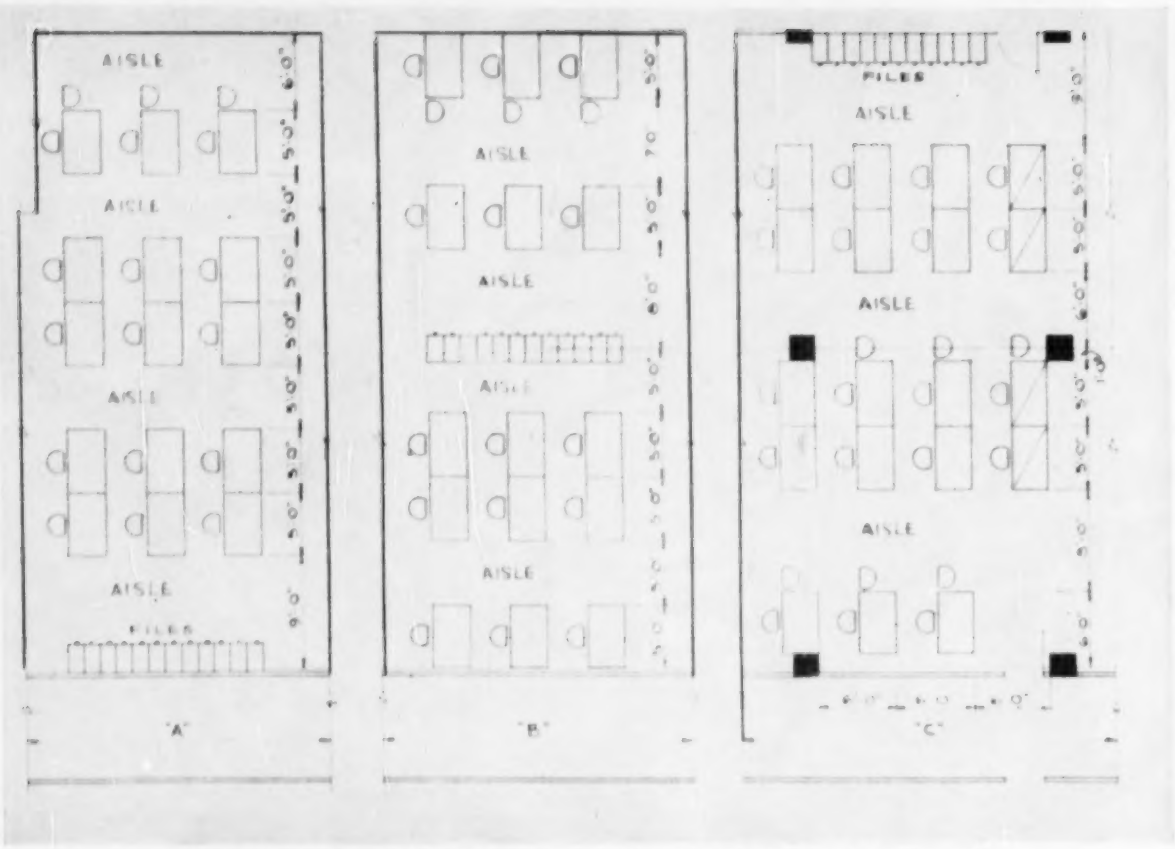


A layout plan that could be used when space allocation is 65 square feet per person

position plan, and it is around this layout that structural and mechanical space conditioning is done to achieve space control. Naturally, when one is planning a new office building if one's objective is to create a building plan that considers the functional requirements of the office organization and not just the building of so many feet of office space, we then have an office building plan that is an office layout, and space disposition and assignments are an easy matter.

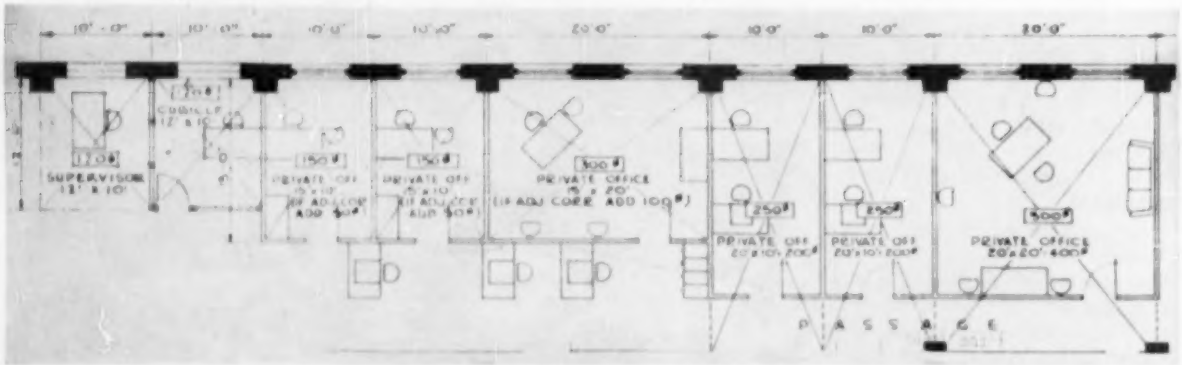
In any office planning one must make sharp distinction between "gross" and "net" area. Here is the standard method of floor measurement for office buildings approved by the Real Estate Board of New York:

"The rentable area of a single tenancy floor shall be computed by measuring from the inside surface of the outer building wall to the inside surface of the opposite outer building wall.

"Rentable area of a single tenancy floor shall *include* all area within the outside walls, *less* building stairs, fire towers, elevator shafts, flues, vents, stacks, pipe shafts and vertical ducts, with their enclosing walls, serving more than one floor.

"Private stairs, private elevators, toilets, air conditioning rooms, fan rooms, air ducts, janitors' closets, slop sinks, electrical closets, telephone closets, with their enclosing walls, within and exclusively serving only that floor, shall be included in rentable area.

"No deductions shall be made for columns and projections necessary to the building. (*To page* 46)



Typical private office space planning layout

Why better furnishings mean better work

Color, good design are as vital as good equipment

by George W. Reinoehl, A.I.D., I.D.I.

Executive Director, Executive Furniture Guild of America

EVERYONE who moves around in office circles has seen significant changes taking place. The roll top desk and the brass spittoon are now pretty much comedy props, but other changes in the 9-to-5 way of life more profoundly reflect the 24-hour way of life.

No longer is it just the bank president, the Wall Street magnate, and the industrial tycoon who are able to provide themselves with handsome backgrounds for working. No longer is it only the "top brass" who have carpets on the floor and curtains at the windows.

The hundreds of thousands of men and women who "get things done" are the bulwark of our cultural, social, and industrial development—and today they are "getting things done" with more comfort, more pleasure, and more efficiency in improved office environments.

Most of us spend a third of our waking hours in offices, during the most creative and productive years of our lives. Simple mathematics add up to the equation of output-office. This is, of course, an exaggeration, but there are some completely valid factors contributing to it:

Getting more work done in less time; better facilities for doing the work; less wear and tear on the nerves and energies; space economy; and the contribution to all of these purposes of

(*To page* 48)

Only **Art Metal** *brings you*

COORDINATED RESOURCES FOR OFFICE MODERNIZING

PLANNING • EQUIPMENT • SYSTEMS

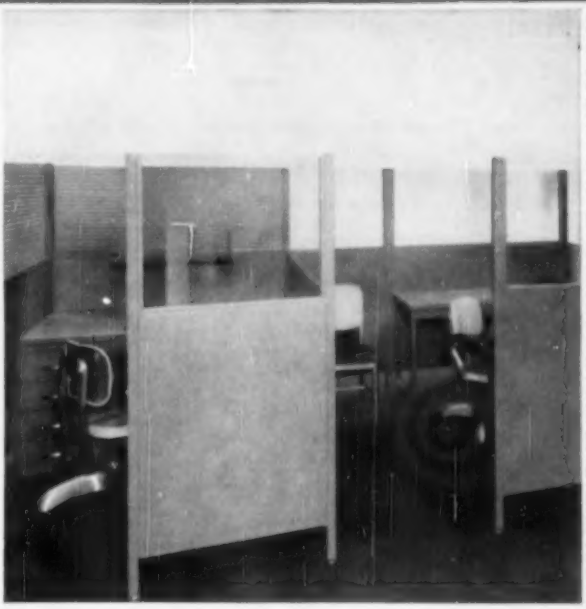
We can help you eliminate waste motion, save time, and have offices that are completely modern in appearance and efficiency. With Art Metal's fully coordinated resources, each worker is placed in proper relation to efficient work-flow, comfortably seated at a functionally organized desk...with time-saving visible record systems and mechanized filing...all at less floor-space cost per work-station. Let us show you what this means for your business.

● **CORRECT-POSTURE SEATING throughout the office.** Nothing encourages sustained and accurate office work like the *fatigue-free comfort* of an Art Metal Aluminum Posture Chair. There's an Art Metal office chair for everybody from the president down, scientifically designed and built for correct body support, soft, cool, all-day comfort. Art Metal's "Tilt-Action" seat and "Live-Action" back permit real in-place relaxation. Ask for the Art Metal Chair Catalog.

● **World's fastest FILING EQUIPMENT.** The revolutionary Art Metal Speed-File costs substantially *less* per filing inch than conventional files of comparable grade, yet provides 33⅓% faster filing, adds 15% to usable capacity. Ends annoying, time-wasting delay in obtaining material from files. There is a size and style of Art Metal file for every need and every type of office record...letter, cap and card, invoice, order and ledger sheets, and engineering drawings. Ask for the Speed-File Catalog.

● **POSTINDEX VISIBLE control systems.** Visible record keeping at its most efficient. Speeds up posting, reveals at a glance the information needed for operating decisions. For every type of business and every department...including Personnel, Sales, Stock, Purchase, Production, Cost and Credit records. Four types of Postindex equipment make it possible to meet individual requirements in the most effective manner, at the lowest possible cost. Ask for Postindex Catalog.

● **JOB-FITTED DESKS for every work-station.** Art Metal New Century desks are "Built for Action, Styled for Leadership." Their functional design and organization for individual job requirements step up office work output and reduce costs wherever they are installed. Art Metal desks meet every office need — they are produced in all sizes in a line that offers the widest selection of executive and general office desks ever developed. Ask for the New Century Desk Catalog.



● **"EL-UNIT" space-saving modular offices.** This new Art Metal development applying the modular principle to office equipment often provides superior working facilities for 3 persons where 2 worked before. The complete line of desk units and work tops fits the requirements of any job, offers unlimited possibility in layout. In open office areas or with steel and glass partitions for privacy...easy to re-arrange or move. Ask for El-Unit Catalog.

● **Credenzas complete the EXECUTIVE OFFICE.** Placed within easy reach of executive desks, Art Metal's new Credenza units save countless steps. Individual needs are met by combining letter files, open-shelf cases or cupboards (with sliding doors of steel or glass) in any desired grouping. Styled, built and finished to match Art Metal's quality desk lines with one-piece flush tops in widths up to 92", creating a custom-made look. Ask for literature on Special Executive Office Furniture.

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in Office Planning

Through your local Art Metal representatives, we offer you an Office Improvement Planning Service based on the widest experience in working with businesses ranging from the largest corporations down to the one-man office.

This service is comprehensive and is available for offices of any size from smallest to largest. It covers revision of present layouts or organization of new ones, efficient use of working time and working space...everything from desk drawer organization and visible record control to consulting on decorator treatment of executive and general offices.

➡ **Just look in the telephone book "Yellow Pages"** under Art Metal, or write Art Metal Construction Company, Jamestown 10, N. Y., for "Office Standards and Planning."

Art Metal
Jamestown, New York
U.S.A.

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Planning space—

(*From page* 42)

"The area of air conditioning and fan rooms located on a rentable floor, serving more than the floor on which located, shall be apportioned and included as rentable area of the floors they serve.

"The rentable area of an individual office or a portion of a divided floor shall be computed by measuring from the inside surface of the outer building wall to the finished surface of the corridor side of corridor partition and from the center of the partitions that separate the premises from adjoining rentable area.

"No deductions shall be made for columns and projections necessary to the building.

"Building stairs, fire towers, elevator shafts, flues, vents, stacks, pipe shafts, vertical ducts, toilets, air conditioning rooms, fan rooms, air ducts, janitors' closets, slop sinks, electrical closets, telephone closets, with their enclosing walls, shall be excluded from rentable area."

From a talk I delivered on "Office Buildings and Office Layout Planning" at an office space seminar of the Boston chapter, National Office Management Association, November 18, I quote the following on the tools and the program of the space administrator:

"*Office Planning Tools.* The tools of the office planner are his daily records and current informational data on the organization, its procedures, and its personnel. His records are master sets of up-to-date structural and mechanical reference drawings and office layouts of the space he is responsible for, which are generally as follows:

"1. A blank plan of the premises showing fixed elements of the office space with dotted lines to indicate the basic circulation plan, and bay or room numbers with the area for each unit of space.

"2. A copy of this plan should be colored to show what areas are assigned to major departments of the company, so that the office planner can make ready reference to these areas and their location and the total number of square feet assigned to each department. This is the space control plan.

"3. An up-to-date office layout showing all partitions and equipment in detail.

"4. An architectural and structural set of drawings, showing physical conditions of the premises and types of partitions.

"5. Mechanical sets of drawings containing information on overhead lighting, switch control, electric and telephone outlets, plumbing, heating, and air conditioning.

"These drawings should be kept up-to-date at all times, and the office planner should keep himself currently informed on all factors affecting organization, procedures, and personnel, so that he can anticipate office space changes. He should know where space will be needed or will become available through increases and decreases in personnel. He must keep abreast of this information if effective space control is to be exercised.

"*Maintenance and Control.* The space administrator's work on the office layout is never really finished, for it is his job to keep the space situation balanced in relation to all elements of the office, and to satisfy daily space requests and related requirements.

"Each of such requests must be followed up for justification, to determine whether it can be satisfied with a minimum of disturbance to the office as a whole. When changes in the office are required to satisfy a space problem, the space administrator is coordinator for all elements of the office layout."

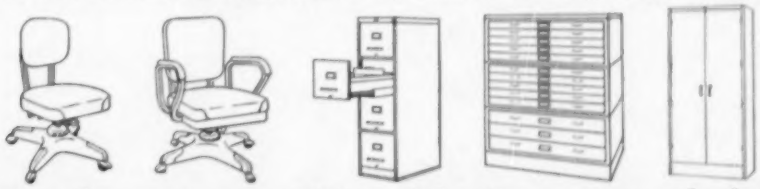
The modern space planner must keep in mind all the many, new needs of company and employee

ASE STEEL OFFICE FURNITURE

Better Built for Better Business

QUALITY

The superior quality of ASE steel office furniture is inherent in its design, construction and finish. The extra advantages ASE offers you are real. You can see them . . . test them . . . compare them at your dealers. • Here are some ASE advantages to look for. All are ASE developments . . . many are exclusive. • Desk tops have rounded corners and mar-proof Styledge Molding set in anodized aluminum trim. Pedestals are tapered . . . styled for pleasing appearance. Pedestal bases are smoothly rounded —no sharp edges to catch or scuff shoes. Island bases afford more comfortable foot room. Desk drawers are extra deep. They glide smoothly, easily, quietly on six patented Nylon bearings. Desks are Bonderite treated to resist corrosion and provide the finest, permanent, lustrous finish. Every ASE product has similar exclusive advantages. See your ASE Dealer and investigate the many extras that mean greater efficiency.



See the smart, new ASE steel furniture at your dealer's

ALL-STEEL EQUIPMENT INC., Aurora, Illinois

Write for complete information. There's an ASE dealer near you

For More Information Use Readers' Inquiry Coupon on Page 202

The environment where one spends one-third of his life should be pleasant

Better furnishings—

(*From page* 43)

scientifically evolved lighting, temperature control, and acoustics.

A lot of able people have been paying a lot of specialized attention to all these factors in recent years—and they have accomplished a lot worthy of our respect and gratitude.

But it seems to me that there is another, equally important area of exploration, and one equally relevant to maximum productivity and personal satisfaction in one's work.

This is a consideration integral to our concept of designing better furniture, and better offices. As a professional artist concentrating on that challenge, as the executive director of the Executive Furniture Guild, I am concerned not only with the technical problems of lighting, temperature, and acoustics, but with the intangible (psychological is the word frequently used) aspects of making offices "look pretty." Frivolous though it sounds, this facet of the office design problem is soundly practical, and by no means peripheral.

It is not yet universally fashionable to admit it, but every working human being wants an office to "look pretty." If that important one-third of one's life is spent in such surroundings, the three-thirds of living is more rewarding—happier, healthier, more productive (and, perhaps, prolonged, by the lifting of tensions).

Balancing color and form

To achieve these positive, if imponderable, benefits, we designers feel that the understanding employment of color, texture, and form, with an intelligent concern for unity, contrast, and balance, is basic to our objective of stimulating greater creativeness and contribution in business activities.

Personally, it took me some time to arrive at this conclusion. Trained initially as an engineer, I was educated to believe that almost anything of importance could be measured, analyzed, and plotted for study and standardization. But as I was faced with problems related to housing the functions and possessions of human beings, I came to realize that the designer trying to solve those problems deals with conditions different from those imposed by machines and, indeed, all other living things.

Specifically, though, the people who actively show an interest in beautifying and improving their working surroundings are special in several respects. First of all, they have not submerged or tried to deprecate this sensitivity to beauty—the quality which distinguishes man from all other living creatures. In fact, it is that quality which has made man master of his own destiny.

Archeologists exploring the beginnings of human history know that even primitive man often set aside the hard practicalities of survival in an effort to make things "look nice." This aesthetic drive has always been a prime motivator, making man "want" things—and work hard to get them.

It is the dynamic builder of cultures, today as well as in the past. And in today's society, it is logically expressed in the desire for more pleasing offices. In many cases this urge may be only partially satisfied because of ignorance in handling design problems, but in any case the fact that *something* is done dramatically demonstrates that the innate force is at work.

The second way good furnishings influence this large and influential segment of business and professional people is outstanding: These are the people of particular importance to the community as a whole, the people with the special drive and determination, the initiative and firmness of purpose who build and maintain a culture. They are the leaders.

The leaders of a culture are its most valuable asset, and therefore worth every possible consideration to encourage and preserve their efforts. To me it has always seemed a paradox that human beings, endowed with the highest living intelligence, have not studied themselves more closely in relation to their environment, to mold it more to their natural instincts, as do plants and animals.

Remote as this idea may seem from hard economic practicalities, more intelligent design of working spaces, more expression in them of fundamental emotional and aesthetic needs, can make us more productive, more positive in our attitudes and accomplishments.

Offices for Living

. . . START WITH FURNITURE BY STANDARD

WILLIAM H. SULLIVAN Design

Look at both sides of this picture. See how this new office furniture development—Continental Omega—makes possible *complete* office-to-office harmony . . . giving you the advantages of correlated, custom-made groupings, *at no extra cost!* Notice how the rich, handsome look of this tasteful executive furniture design may be carried through to secretarial, junior executive and clerical offices—and tailored to each person's office space and job. *Perfect coordination of style and function!* Practical and economical, because Continental Omega is available in nine basic desk styles . . . in many variations of table and service units . . . with chairs, desk pads—everything in related designs and color schemes. *See this and other "Offices for Living" you and your staff will be proud and happy to work in. Send for free folder in color and name of your nearest Standard Dealer, or look him up in the Yellow Pages.*

The Standard Furniture Company, Herkimer, New York.

Standard

SINCE 1885, THE WORLD'S LARGEST MAKER OF EXECUTIVE OFFICE FURNITURE

CONTINENTAL OMEGA EXECUTIVE FURNITURE, CHAIRS, DESK ACCESSORIES AND COLOR CONTINUITY PLANS ARE EXCLUSIVE WITH STANDARD DEALERS

A happier working life means a longer one. Physicians know that forced concentration in the face of noise and other distractions is actually a traumatic strain with far-reaching physiological and psychological effects. Poor light, or poor ventilation, produce similar irritations.

Since it has been scientifically established that human beings can be harmed by such physical irritations, it is reasonable to assume that they can be similarly affected by less obvious ones—jarring or depressing colors, discordant spatial relationships and forms, lack of order and balance, gaudiness—all the bad design hallmarks. In effect, they are aggravating rather than stimulating, as a well-designed office should be, to function as a useful working accessory.

A key factor in the well-designed office is color. Since Sir Isaac Newton discovered the nature of color almost 300 years ago, a great deal has been written concerning the scientific, or physical, aspects of it. But until recently, the subtler, psychological force of color and its impact on human beings, have been generally overlooked. Because of mistakes in the use of color we put up with a great deal of avoidable nervous irritation, as well as loss of efficiency in industry and in offices. Merchandising experts, too, recognize color as a key factor.

But color is not only a primary consideration in living—it is also personal. Believing this to be so, we designers of Executive Furniture Guild offices make individual color preferences the starting point in working out completely compatible 9-to-5 environments.

Actually, today's business man frequently spends more than that time in his office, and more and more the modern office scope is broadening, taking on more and more aspects of the home. Comfortable conference and conversation areas are, deservedly, receiving more attention in the concept of the more versatile office. For such an office, even kitchen fixtures will soon be commonplace, as we do semi-social entertaining in them frequently, both during and after business hours.

We also predict that there will be "executive automation," reflecting mechanical ingenuity translated into energy-saving devices such as the remote-control of draperies, of doors, of windows, of air-conditioning, of dimmer lights—of whole walls of electronic elements, including hi-fi equipment.

Great window expanses, utilizing new kinds of glass, will dictate new lines in office furnishings—broader, longer, and lower—which will contribute to the new look of serenity. That look is very definitely superseding the look of office austerity—of steel filing cases and stark severity.

I am convinced that a valid contribution to efficiency is beauty, and comfort, in an office which reflects the individuality of its owner, and is his rewarding possession, as well as his working quarters.

New developments in office furniture

DEVELOPMENTS in the field of office furniture are largely concerned with style, but while nobody has come up with an atomic chair or an electronic desk, there have been some advances in the last few years both in design and in materials used. These often contribute to efficiency.

There appears to be, for example, a growing use of fiber glass or of combinations of fiber glass and plastic materials for the bases of chairs and the feet of desks, because of the strength of these materials and their ability to withstand scuffing. Such materials are of the same consistency and appearance throughout, so that scratches or cuts do not reveal bare metal or unpainted wood beneath.

Plastics are being used more and more on desk tops, where their resistance to staining, scuffing, and scarring are proving of value in maintaining smooth writing surfaces throughout the life of the furniture.

Modular furniture is increasing in importance. The ability to select the basic furniture components and to combine them in what is in effect a custom installation has considerable appeal. Thus desk pedestals of any of various designs may be combined with desktops of different sizes and shapes. Often such combinations take the form of L-shaped working areas, which also are growing in popularity because of their convenience. This arrangement has the further virtue, when several such units are consolidated, of reducing the floor area required for each worker. The design cleverly converts aisle area to working area, making it possible to get more desks and chairs in a given space than is possible with conventional equipment.

Among other new features being seen currently are the installation of wastebaskets in the pedestals of executive desks and the development of writing slides with plastic coverings for reference materials it is desired to leave open for consultation.

It is possible to visualize in advance what a projected new office will look like, both in terms of layout and furnishings by means of the Certified Office Planning Service offered by the Wood Office Furniture Institute through selected dealers. Office executives can work out a scale floor plan through this service, and match upholstery, furniture types, and finishes before ordering.

Wood furniture continues to hold its place at the top of the luxury list. Metal furniture, however, is tending to replace it at the general office level. Modular furniture is available both in metal and wood, and is often designed for use with movable partitions.

Following is a list of the principal manufacturers of office desks and chairs. An indication is given, where the information is available, of the types of equipment offered by each company. The following codes are used for that purpose:

C—chairs
D—desks
M—metal furniture
Mo—modular units
W—wood furniture

Advance Design, Inc., 45 *W. 33rd St., New York. (C, D)*

Ajusto Equipment Co., 2144 *Madison Ave., Toledo* 2. *(C; M)*

All-Steel Equipment Inc., 100 *Griffith Ave., Aurora, Ill. (C, D; M)*

Alma Desk Co., Drawer 271, *High Point, N. C. (D; W)*

Aluminum Seating Corp., 17 *S. Cherry St., Akron* 8. *(C; W)*

Alvin Industries, 14-104 *Merchandise Mart, Chicago. (C; M)*

(*To page* 52)

Security

Where Security Belongs

The Manufacturers Trust Company chose wisely when they selected Security Steel Office Furniture for this installation in their "Award of Merit" Fifth Avenue building. For Security is more than a name in office furniture. It is *office efficiency*—handsome, rugged efficiency that is always modern as today's offices.

Security's four complete lines of steel office furniture—Crestline, TD 30" Line, 4-Leg Line and Versa-Line—cover the entire price range . . . for the finest office at truly moderate cost.

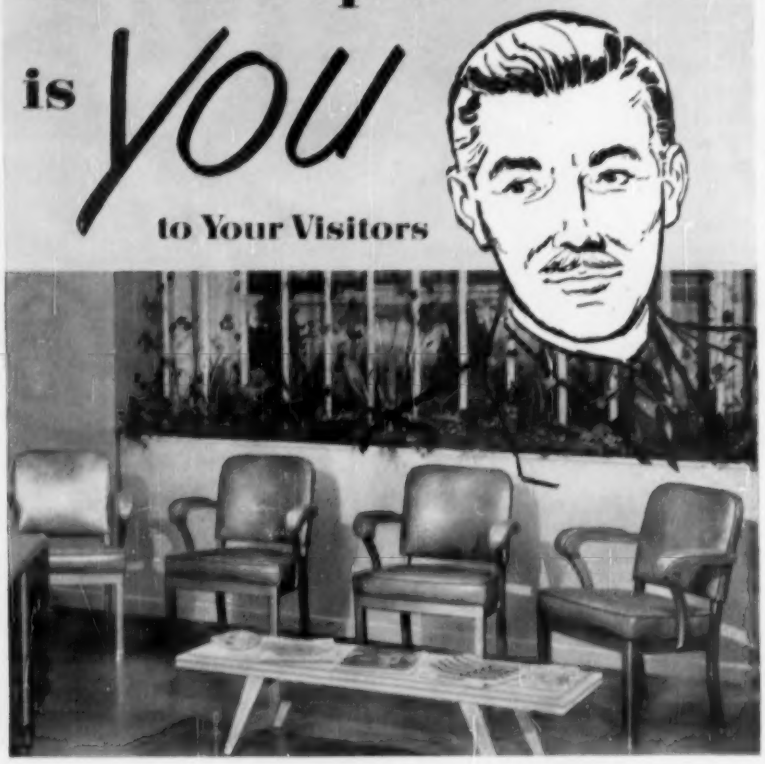
Write for your catalog of Security Office Furniture.

SECURITY STEEL EQUIPMENT CORPORATION

AVENEL, NEW JERSEY

For More Information Use Readers' Inquiry Coupon on Page 202

Your Reception Room is *You* to Your Visitors



INDIVIDUAL CHAIRS ADD TO THE LOOK OF HOSPITALITY AND SUCCESS

First impressions are good—*and lasting*—when you compliment your visitors with the fine appearance and comfort of Harter chairs in your reception room.

With these chairs you can enhance the color scheme of your offices. You choose from a wide range of colors in leather, fabric or plastic upholsteries. For example, the C-1910 chairs are shown above in top grain leather. The Harter 710 pictured separately has rich fabric upholstery.

Metal finishes are durable baked-on enamel. Again you select the color either from the standard office finishes or from the new pastels which harmonize with the decorative tones in upholstery.

Model 710

Top quality upholsteries and steel construction enable Harter chairs to keep their like-new appearance for years and years. They're a sound business investment that says nice things about you to your visitors.

Write for literature on Harter chairs . . . we'll send name of your nearest dealer.

HARTER POSTURE CHAIRS

STURGIS, MICHIGAN

HARTER CORPORATION, 132 Prairie Street, Sturgis, Michigan

In Canada: Harter Metal Furniture Ltd., Guelph, Ontario

(*From page 50*)

Art Metal Construction Co., Jones & Gifford Aves., Jamestown, N. Y. (C, D; M)

Art Steel Sales Corp., 170 W. 233rd St., Bronx, N. Y. (D; M)

Automatic File & Index Co., 549 W. Washington Blvd., Chicago 6. (D; M)

Barcalo Mfg. Co., 166 Chandler St., Buffalo 7. (C; W)

Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., N.E., Canton 5, Ohio. (D; M)

Blair Aluminum Furniture Co. Inc., P.O. Box 31, Marietta, Ga. (C; M)

Browne-Morse Co., Muskegon, Mich. (C, D; M)

Carlton-Surrey, Inc., Exhibitors Bldg., Grand Rapids 2, Mich. (C, D, Mo; W)

Central Desk Mfg. Co., 454 N. Armour St., Chicago 22. (D)

Challenger Steel Products Corp., 350 Morgan Ave., Brooklyn, N. Y. (D; M)

The Champion Furniture Co., P.O. Box 2462, Hickory, N. C. (D)

Clarin Mfg. Co., 4640 W. Harrison St., Chicago. (C; M)

Clark & Gibby, Inc., 20 E. 41st St., New York 17. (C, D, Mo; W)

Clemco Desk Mfg. Co., P.O. Box 266, Bloomfield, Ind. (D)

Cole Steel Equipment Co., Inc., 285 Madison Ave., New York 17. (C, D, Mo; M)

Columbia Steel Equipment Co., Fort Washington, Pa. (D; M)

Corry-Jamestown Mfg. Corp., Corry 5, Pa. (D, Mo; M)

Cramer Posture Chair Co., Inc., 1205 Charlotte St., Kansas City 6, Mo. (C; M)

D & L Office Furniture Co., 61 W. Hubbard St., Chicago. (D, Mo; W)

Dependable Mfg. Co., 2407 Fort Crook Rd., Bellevue, Neb. (C; M)

Dixie Chrome Products, Div. of Southern Consolidated Mfg. Corp., 711 E. First St., Irving, Texas. (C, D; M)

Domore Chair Co., Inc., 216 Monger Bldg., Elkhart, Ind. (C; M)

Doro Mfg. Co., 220 W. Institute Place, Chicago 11. (D)

Dorset Steel Equipment Co., 2514 W. Dauphin St., Philadelphia 32. (D; M)

Doten-Dunton Desk Co., 26 Otis St., Cambridge 41, Mass. (C, D, Mo; W)

Dunbar Furniture Corp. of Indiana, Berne, Ind. (C, D; W)

Durable Metal Products Co., 1709 St. Marks Ave., Brooklyn 33, N. Y. (D; M)

Not just a complete line, but a complete QUALITY line for every office need . . . that's PEERLESS

Complete in every detail of rugged construction. Complete in every detail of stylized design. Complete in every wanted model of desks, filing cabinets, tables, chairs and accessories.

Appearance, comfort and performance are designed into every desk model . . . and they're amazingly free of maintenance problems.

Then, consider the complete line of filing cabinets. There's a quality cabinet for your every filing need. In addition, the availability of every type of insert enables you to choose the right piece of equipment for each requirement.

All in all, you'll find the Peerless line is the quality line that's designed to your needs.

PEERLESS

PEERLESS STEEL EQUIPMENT CO.

6600 Hasbrook Ave., Philadelphia 11, Pa.

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For More Information Use Readers' Inquiry Coupon on Page 202

Duracold Corp., 1347 *39th St., Brooklyn, N. Y. (D)*

Emeco Corp., Maple Ave. & High St., Hanover, Pa. (C, Mo; M, W)

Empire Chair Co., Johnson City, Tenn. (C)

Executive Furniture Co., 2800 *Virginia, Wichita Falls, Texas. (D, Mo; W)*

Executive Furniture, Inc., 911 *S. Walker St., Oklahoma City* 1, *Okla. (D)*

Feldman-Selje Design Associates, 910 *East Fourth St., Los Angeles* 13. *(C, D)*

L. C. Flewelling Co., 12411 *Industrial Ave., Hollydale, Calif. (C, D)*

The Fritz-Cross Co., St. Cloud, Minn. (C; M)

The General Fireproofing Co., 413 *Dennick Ave., Youngstown* 1, *Ohio. (C, D; M)*

The Globe-Wernicke Co., 5025 *Carthage Ave., Norwood, Cincinnati* 12. *(C, D, Mo; M)*

Grand Rapids Leather Furniture Co., Inc., 201 *Front St., N. W., Grand Rapids, Mich. (C, D; W)*

Gregson Mfg. Co., Liberty, N. C. (C)

W. H. Gunlocke Chair Co., Wayland, N. Y. (C; W)

The H-O-N Co., Third & Oak Sts., Muscatine, Iowa. (D; M)

Haeger Desk Co., 1663 *Merchandise Mart, Chicago* 54. *(D)*

Hamilton Desk Co., High Point, N. C. (D)

Hamilton Mfg. Corp., 2525 *State St., Columbus, Ind. (C; M)*

Hanes Chair & Furniture Co., Inc., Mocksville, N. C. (C, D)

Harrison Steel Cabinet Co., 4718 *W. Fifth Ave., Chicago* 44. *(D; M)*

Harter Corp., 80 *Prairie Ave., Sturgis, Mich. (C; M)*

Haskell, Inc., 303 *E. Carson St., Pittsburgh* 19, *Pa. (D, Mo; M)*

Hercules Seating Co. Inc., 25 *Park Place, New York* 7. *(C)*

High Point Bending & Chair Co., P.O. Box 312, *Silver City, N. C. (C; W)*

Hillside Metal Products Co., 262-270 *Passaic St., Newark* 4, *N. J. (D; M)*

Hoosier Desk Co., 310 *S. Mill St., Jasper, Ind. (D)*

Huntington Chair Co., 20*th St. and Second Ave., Huntington* 18, *W. Va. (C, D; W)*

Imperial Desk Co., 1312 *W. Florida St., Evansville* 7, *Ind. (D; W)*

Indiana Chair Co., P.O. Box 70, *Jasper, Ind. (C; W)*

Indiana Desk Co., Inc., 1201 *N. Mill St., Jasper, Ind. (D; W)*

Invincible Metal Furniture Co., 842 *S. 26th St., Manitowoc, Wis. (C, D, Mo; M)*

Jasper Chair Co., Jasper, Ind. (C; W)

The Jasper Desk Co., P.O. Box 111, *Jasper, Ind. (D; W)*

Jasper Office Furniture Co., 13*th & Vine Sts., Jasper, Ind. (D; W)*

Jasper Seating Co., Inc., Jasper, Ind. (C; W)

The Johnson Chair Co., 7109 *Merchandise Mart, Chicago* 54. *(C)*

Kenmar Mfg. Co., East Palestine, Ohio. (C)

The Kenwood Corp., 2412 *Pennsylvania Ave. N. W., Washington* 7, *D. C. (D; W)*

Kewaunee Mfg. Co., 5021 *S. Center St., Adrian, Mich. (C)*

King Posture Chair Co., 953 *S.*

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Visitor

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wells

Aristocrats

... the most beautiful and comfortable office chairs in the world!

Director

34

perfectly matched, moderately priced models — to fit any office need

Vice President

Secretary

"Aristocrat" Comptroller No. 224
Tilting Seat and Back
$62.40 list, zone 1
in Elastic Naugahyde

You can be seated in concentration for many hours, totally unaware of sitting because of the Aristocrat's feeling of complete ease.

Comptroller

A Wells Posture Perfect Chair is fashioned in steel for strength. Its silent mobility is castered in the finest of hooded ball bearing wheels. *The cushioning material is entirely of thick, luxurious foam rubber.* Finished in your choice of soft enduring leathers, rugged almost indestructible Elastic Naugahyde, or the luxury of Gros Point Mohair or economical Newport Fabric, masterfully tailored. Available in one material or any combination of materials and colors.

Receptionist

Guest

Send TODAY, for
NEW FREE CATALOG!

Wells Chair Corporation
Dept. Y-56
Michigan City, Indiana

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Raymond Ave., Pasadena 2, Calif. (C)

Knoll Associates, 575 Madison Ave., New York 22. (C, D; M, W)

Korda Industries, 20 West 46th St., New York 19. (D)

Lehigh Desk Co., 106 Duane St., New York. (D; W)

Lehigh Furniture Corp., 16 E. 53rd St., New York 22. (C, D, Mo; W)

The Leopold Co., 914 Osborn St., Burlington, Iowa. (D; W)

Macey-Fowler, Inc., 305 East 63rd St., New York. (C, D; W)

The B. L. Marble Chair Co., 89 Willis St., Bedford, Ohio. (C; W)

Maso Steel Products, 53 W. Jackson Blvd., Chicago 4. (C; M)

Metal Office Furniture Co. SEE: *Steelcase, Inc.*

Herman Miller Furniture Co., Zeeland, Mich. (C, D, Mo; W)

The Milwaukee Chair Co., 3022 W. Center St., Milwaukee 45. (C; W)

Milwaukee Metal Furniture Co., 3022 W. Center St., Milwaukee 45. (C; M)

Modern Steelcraft, Inc., 230 Fifth Ave., New York 1. (D; M)

Modernize, Inc., 666 Lakeshore Drive, Chicago. (C)

Monarch Furniture Co., Inc., 311 E. Green St., High Point, N. C. (C, D)

Morval Corp., Herkimer, N. Y. (C, D; W)

Murphy Chair Co., Inc., 931 Wing Ave., Owensboro, Ky. (C; W)

Murphy-Miller, Inc., 2103 Bluff St., Owensboro, Ky (C)

Myrtle Desk Co, P. O. Box 1750, High Point, N. C. (D; W)

National Cabinet Co., 21-24 44th Avenue, Long Island City, N. Y. (D)

The National Desk Co., Inc., 88 West St., Ilion, N. Y. (D)

Niagara Mfg. & Distributing Corp., Adamsville, Pa. (C)

Niemann, Inc., 469 E. Ohio St., Chicago 11. (C)

Norcor Mfg. Co., Inc., 301 Bridge St., Green Bay, Wis. (C)

Norquist Products, Inc., 415 Chandler St., Jamestown, N. Y. (C; M, W)

Ohio Chair Co., Inc., 28 W. Madison Ave., Youngstown, Ohio. (C; M)

Old Hickory Furniture Co., Martinsville, Ind. (C; W)

Orna Metal Products Co., 2412 S. Seventh St., St. Louis 4. (D, Mo; M)

Peerless Steel Equipment Co., Unruh & Hasbrook Aves., Philadelphia 11. (D; M)

Precision Mfg. Co., 829 Chicago Ave., Evanston, Ill. (C)

(To page 58)

ONE OF **10** ADVANTAGES OF THIS NEW WONDER-WEARING WOOD OFFICE FURNITURE

48 HOURS IN THE WATER BATH

...AND *this "welded" wood won't warp!*

Imagine—"welding" wood desks electronically to prevent warp and shimmy under any climatic condition! Unheard of until now. But so was Morval's Duratop—the first non-glare top that won't be stained by carbon paper, lipstick, ink or coffee. Add other wonder-wearing maintenance features . . . plus the advantage of having the beauty and comfort of wood. Now, add efficient, space-saving, step-saving design . . . plus up to 20% cost savings. Add all and you have Morval—today's finest furniture value for any office. For literature, see your Morval dealer, or write today—Morval Corporation, Dept. T-1, Herkimer, N.Y. A division of Standard Furniture Co.

Morval's new materials and new methods bring you savings never before possible!

COSTS up to 20% LESS

than conventional wood or steel office furniture of comparable quality

MORVAL FUTURONIC OFFICE FURNITURE

Striking duo tone colors . sizes . . . designs for space-saving combinations for business . professional and institutional use

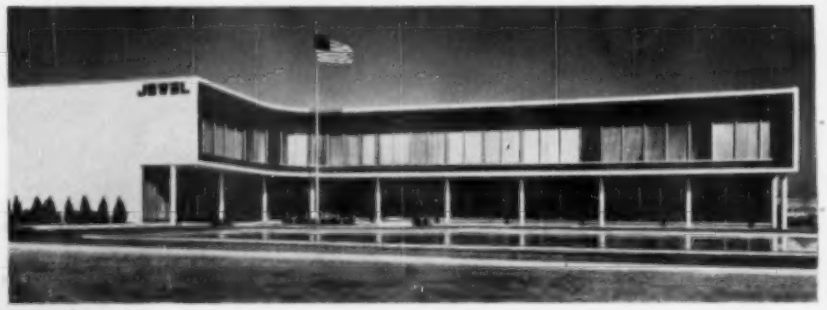
GRAND RAPIDS FURNITURE

Steelcase Custom Line Furniture Chosen by Jewel Tea Co., Inc.

Custom line Steelcase Furniture used in Jewel Tea Co., Inc. offices.
Jewel Tea Co., Inc., Melrose Park, Ill.

Interiors
designed by Harper Richards.

Architect:
A. Epstein & Sons



General office view of the Jewel Tea Co., Inc.

STEELCASE INC

GRAND RAPIDS, MICHIGAN.

Whenever you want to make a good office . . . a little better

For More Information Use Readers' Inquiry Coupon on Page 202

in two "OFFICES OF THE YEAR"

Stow & Davis Executive Furniture Selected by International Brotherhood of Teamsters

One of the International Brotherhood of Teamsters Executive conference rooms.

International Brotherhood of Teamsters, Washington, D.C.

Interiors
designed by
Office Equipment Co., Chicago.

Architect:
Holabird, Root & Burgee,
Chicago.

An executive's office.

STOW & DAVIS

EXECUTIVE FURNITURE MANUFACTURERS

GRAND RAPIDS, MICHIGAN.

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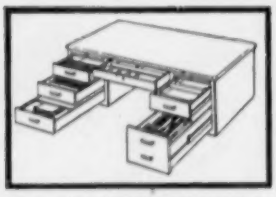
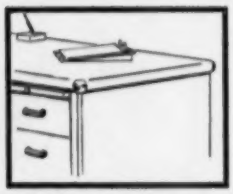
More Time for Management

NEVER before in the history of American business has the handling of detail been so important. Shaw-Walker *"time-engineering"* has perfected features that make the organizing and handling of office work easier. These features, exclusive with Shaw-Walker, give management more time to manage.

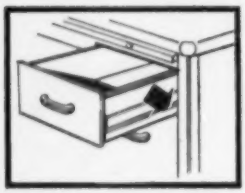
This stylized Work-Organizer Desk is the closest approach to desk automation yet created. *"Time-Engineered"* 22 ways to make each day's work easier and more productive. 86 models for every need.



Drawer Interiors Are Planned to make every move easier, faster. Drawers provide specific places for *all* work and working tools—keep top entirely clear of everything but job at hand—guaranteed to eliminate clutter.



Modern As Tomorrow—Years ahead in beauty and comfort. Stylized base, recessed back. There's a wide choice of top styles, top materials, drawer arrangements and color styling.



Noiseless Drawers Easier on Nerves. Permanently lubricated nylon glides and acoustical fiber soundproofing combine to achieve a new high in easier, quieter operation and a more efficient office.

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For More Information Use Readers' Inquiry Coupon on Page 202

(From page 55)

Precision Metal Workers, 3100 Carroll Ave., Chicago. (C)

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. (C, D; M)

J. K. Rishel Furniture Co., 1201 W. Third St., Williamsport 19, Pa. (D; W)

Riteform Chair Co., Inc., 2300 Ellis Ave., St. Paul 5. (C; M)

Rockwell-Barnes Co., 35 E. Wacker Drive, Chicago 2. (D)

Royal Metal Mfg. Co., 175 N. Michigan Ave., Chicago 1. (C; M)

H. Sacks & Sons, 667 Madison Ave., New York. (D; W)

Frank Scerbo & Sons, Inc., 536 Pearl St., New York 7. (C, D; W)

Security Steel Equipment Corp., 50 Manhattan Ave., Avenel, N. J. (C, D, Mo; M)

The Shaw-Walker Co., 1950 Townsend St., Muskegon, Mich. (C, D; M, W)

Shelbyville Desk Co., 403 S. Noble St., Shelbyville, Ind. (D; W)

The Sikes Co. Inc., 20 Churchill St., Buffalo 7. (C; W)

Southern Desk Co., Hickory, N. C. (D)

Standard Furniture Co., S. Washington St., Herkimer, N. Y. (D)

Stanley Mfg. Co., 2310 N. Main St., Fort Worth 6. (C; W)

Steelcase, Inc., 1491 Division Ave. S, Grand Rapids 2, Mich. (C, D; M)

Stout Chair Co., Liberty, N. C. (C)

Stow & Davis Furniture Co., 80 Front Ave. S.W., Grand Rapids 4, Mich. (C, D; W)

The Sturgis Posture Chair Co., 154 E. Erie St., Chicago 11. (C; M, Fiber Glass)

The Taylor Chair Co., Bedford, Ohio. (C; W)

Thomas Furniture Co., 420 Manning St., High Point, N. C. (C; W)

Wells Chair Corp., P.O. Box 230, Michigan City, Ind. (C; M)

Wells Furniture Mfg. Co., Laurel, Miss. (C, D)

Western Mfg. Co., 532-544 N. Highland Ave., Aurora, Ill. (D; M)

Wilhite Mfg. Co., Inc., 561 Surf St., Chicago. (D)

Wilmade Furniture Co., 381 Main St., Gardner, Mass. (C)

The Worden Co., 200 E. 17th St., Holland, Mich. (D; W)

Yawman & Erbe Mfg. Co., P.O. Box 880, Rochester 3, N. Y. (C, D, Mo; M)

Office Management's Sixth Annual

"Office of the Year" Awards

In the following pages, *Office Management* presents in text and pictures the six new offices which have won its "Office of the Year" Awards for 1955. Awards are given in two categories—to offices designed for more than 500 employees, and offices designed for fewer than that number. Basis of the editorial board's selection is a survey taken among members of the American Institute of Architects and the Association of Consulting Management Engineers known for their particular interest in the office.

Office of the Year Award

(for offices designed for more than 500 employees)

IN THE GREAT CITY where the American skyscraper was born, a towering new addition to the Chicago skyline provides space for present needs and future expansion for the Mid-America Home Office of the Prudential Insurance Co. of America, this year's winner of the "Office of the Year" Award for offices designed for more than 500 employees.

Prudential Insurance Company of America

Mid-America Home Office—Chicago

Presentation of the "Office of the Year" Award plaques took place in office of Mayor Richard Daley of Chicago. Left to right: Robert Smith, editor, *Office Management*; Mayor Daley; James Rutherford, vice president in charge, Mid-America Home Office, Prudential Insurance Co.; George Clements, president of the Jewel Tea Company

THE TALLEST SKYSCRAPER built in the United States for the last fifteen years, the new Mid-America Home office of the Prudential Insurance Company is not only the highest building in Chicago, it is the first major office building constructed in that city since 1935.

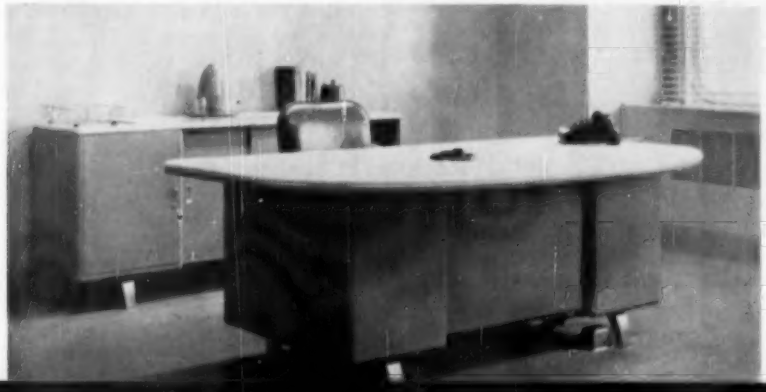
Legal deadlock broken

But the new Prudential building, dominating as it does the Michigan Avenue skyline, represents something more important to Chicago than merely a new building record. For Prudential's building represents the solution of a legal and architectural problem that for years has blocked any office building in a large area of invaluable Chicago business real estate.

The Prudential building is built over railroad tracks of the Illinois Central Railroad—tracks which lie along the lakefront area which many consider to have a business building

Main lobby opens on to E. Randolph Drive. Picture was made during formal opening ceremonies

Typical manager's office. Below: typical executive office (8th floor)



Lobby escalators serve first four floors

Typical clerical area (shown here during Christmas season) is painted in decorator colors. Music is piped in through mounted speakers

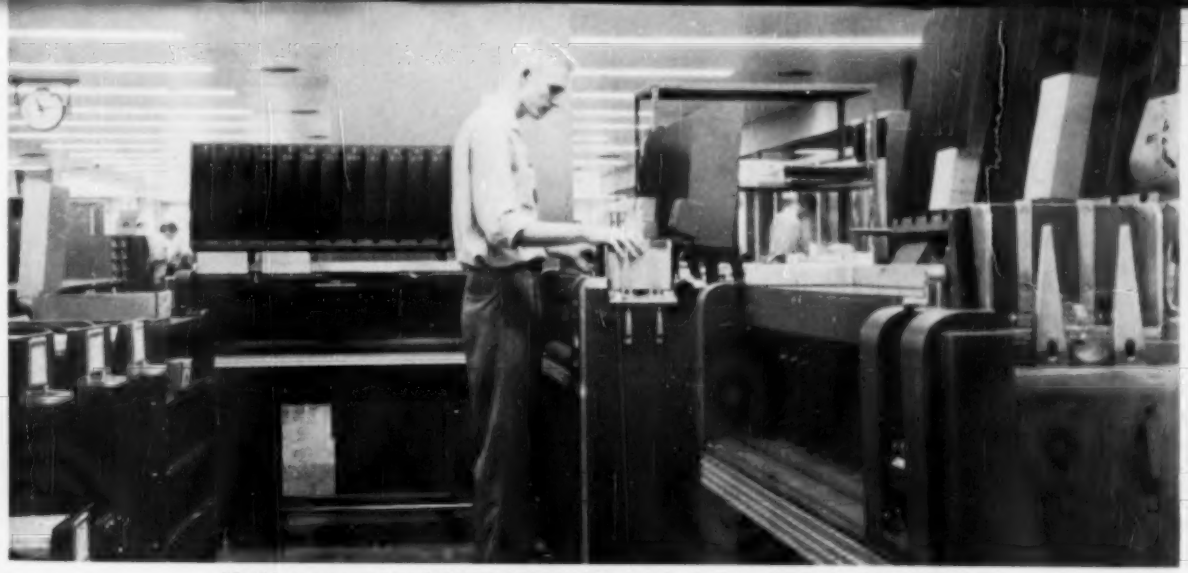
Guest dining room (8th floor) can be divided into three rooms

Prudential—

potential equaled only by the Chicago loop. Yet the difficulty concerned in creating "a building in the air", in constructing a business building *above* land owned and used by another concern, has prevented any previous building in the long stretch of land covered by the rail tracks.

In effect Prudential has title to the air above the tracks—it has built a castle in the sky. Its air-built castle has a solid foundation—steel caissons supporting the building are sunk in individual small round lots between the railroad tracks, which Prudential purchased. Thus Prudential owns the ground which holds the columns supporting the building, and the air above these isolated pieces of ground. Its other purchase was the air rights over the tracks proper—the air occupied by the new 41 story building, designed by Naess and Murphy of Chicago.

Obviously, negotiation of such a complicated purchase was a long, difficult, and time-consuming problem—so much so that Prudential was the first company to accomplish it success-



Machine accounting division is one of the most important units at Prudential

Machine room on the 6th floor houses one of the city's largest punched card installations

fully, and then only after nearly two years of negotiations in which Prudential was identified to the potential seller only as a reliable buyer, and was never mentioned by name. Only ten people within the Prudential organization even knew negotiations to purchase the land were under way.

The building born in this atmosphere of mystery is a bold and forthright example of the functional type of architecture first exemplified by Rockefeller Center in New York. A clean slab-like structure of Indiana limestone, the plain unbroken facade is relieved by the use of aluminum window spandrels, and the bordering of a projecting central band of windows by unbroken vertical bands of limestone.

The interior of the building preserves the same clean, uncluttered look charactertistic of the exterior. The main lobby is restrained in treatment, with color used as the dramatic accent. Vermilion pink marble from Canada, decorates the main lobby, while domestic marble is used for elevator lobbies on the higher floors.

Escalators serve lower floors

Ingenious use has been made of a combination of escalators and elevators in the new building to facilitate traffic within the first four floors. Escalators connect the building lobby, and the Illinois Central station beneath it. Escalators also carry traffic between the lobby and the first four floors of the building. The escalators are designed to operate at a rate of 120 feet per minute, thirty per cent faster than average.

Twenty-seven automatic passenger elevators serve floors not reached by escalators, and of these the four units connecting the lobby with the twenty-seventh through fortieth floors are the fastest in the world, reaching a top speed of 1,400 feet per minute.

Building facilities include a ground floor assembly hall which has a seating capacity of 1,000. This hall serves a dual purpose. Prudential uses it for its own functions, and also will rent it to outside groups when it is not needed by the company. Panelled in Philippine mahogany, the Assembly Hall is equipped to handle any type of theatre or display presentation.

Two-level parking facilities with direct access to the lobby and adjacent levels offer workers an opportunity to find parking space in crowded Chicago. A further pedestrian connection at basement level leads to a 2400 car city-operated garage under Grant Park, just behind the new skyscraper.

Occupying eight floors of the new building, Prudential's Mid-America home office staff operates what is in effect a complete home-office, following the Prudential plan of decentralized operating management.

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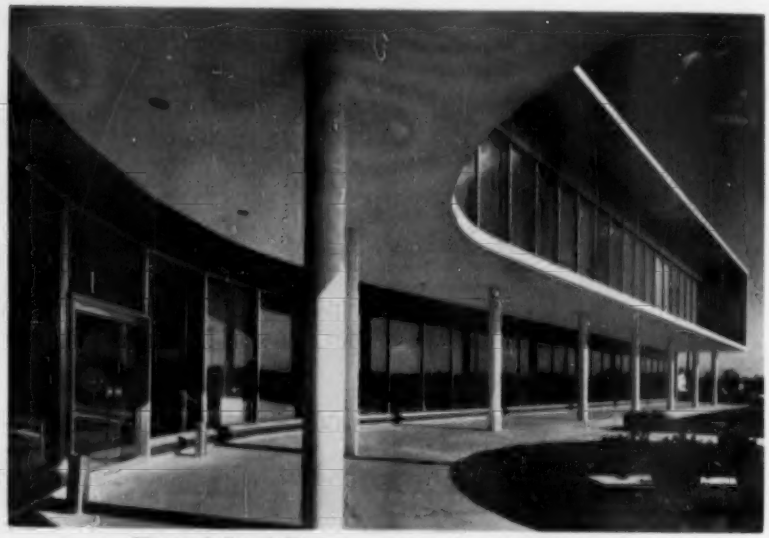
Jewel Tea Company

Offices at Melrose Park, Ill.

THIS BIG BUSINESS in the food field, which was established in 1899 by a man with a single horse and wagon and $700 in capital, and is now doing business in forty-two states and the District of Columbia, has built for itself a new administrative headquarters taking full advantage of a suburban site for an office brilliantly conceived and executed with all the company's varied needs in mind, which wins this year's "Office of the Year" Award for offices designed for less than 500 employees.

Office of the Year Award of Merit

(for offices designed for less than 500 employees)



View of Jewel Tea's sweeping, glass-fronted facade.

Robert Smith, (left) editor, *Office Management*, presents award plaque to Jewel Tea president George Clements, (right), at ceremony in office of Mayor of Chicago, Richard Daley, (center).

"CLEANLINESS AND FRIENDLINESS" is the motto that has characterized the Jewel Tea Company from its start as a door-to-door selling operation employing a single horse and wagon in 1899, to its present status as a multi-million dollar operation embracing door-to-door selling, the mail order business, and chain food stores.

The fact that the company has never departed from this sentiment is underlined in every aspect of its new administrative headquarters offices in Melrose Park, Illinois. Cleanliness, of course, can be taken for granted in any modern office, and a degree of friendliness, but few offices have emphasized the latter quality through every bit of their office planning, and every office facility as insistently as Jewel has in its striking new offices in the suburbs of Chicago.

Thus, waiting rooms for visitors at Jewel Tea have their own coat closets, and washrooms. Special display rooms are provided for salesmen who wish to prepare presentations for Jewel buyers. Television sets are provided in the reception areas; hot coffee is served visitors waiting in them.

The same warmth that makes such a distinct impression on the casual visitor is evident within the offices. At Jewel Tea, everyone, from clerk to top executive, has exactly the same type of desk: a custom-designed unit that employs standard steel desk drawers in a specially designed wooden frame, with a formica top. There is only one exception to this uniformity of equipment for officer as well as employee—the company president. He doesn't have the standard desk simply because he prefers a table for his working area rather than a desk of any type.

The desks were designed by Harper

Gracefully curving stairway, complementing the design of building's exterior, rises from Jewel Tea lobby

Spacious, richly carpeted and furnished office of Jewel Tea president, George Clements, features huge louvered window.

View of warm and spacious general office area at Jewel Tea

Richards, Chicago industrial designer, who was responsible for all interior design in the building.

In line with the same determination to maintain an air of open, democratic informality throughout the office, the private offices within the building employ walnut wall panelling to wainscot height, topped by clear glass, so that private offices are not cut off so completely from general office areas as they would be by ordinary walls. In addition, private offices themselves have been held to a minimum, and all of them are without doors.

The new Jewel offices are not a clerical processing center as such, but an administrative and executive headquarters primarily. An L-shaped building of glazed grey brick designed by A. Epstein and Sons, Chicago, it follows the modern trend by having the entire front of the building constructed of floor to ceiling thermopane glass. A reflecting pool in the landscaped area is sheltered by the two arms of the building.

The two floors of the building serve two distinct purposes. The first floor serves primarily as a merchandising center in which Jewel buyers talk to the various salesmen whose products Jewel may distribute. (Jewel does not itself manufacture the products it sells). The second floor is given over to administrative and sales operating groups. In line with their differing functions each floor has a separate reception room, the one on the second floor being reached by a terrazzo covered steel spiral staircase winding up from first floor reception.

A private office and adjoining conference room

The first floor has no private offices at all, while the second floor has the type of "open" private office mentioned above for top company officers only. The first floor houses switchboard facilities, the sample display rooms used by visiting salesmen, the photostat and mailing room and sampling rooms for testing food products which Jewel may be interested in buying.

The first floor also houses one of the company's particular prides—its handsome new employee cafeteria, where the entire office staff of 178 can be fed in one hour. The cafeteria is connected by folding doors to an employee lounge, which not only serves as a recreation area for employees, but

Jewel Tea employees have well-equipped lounge for relaxation and recreational use

Sunny, bright-colored cafeteria which can feed entire staff in an hour is acoustically treated, warmly decorated

also houses a control panel which can be used as a public address system within the building, to pipe music to employees while they work, and as a broadcasting station from which the Jewel "round-up", a brief message covering events in the company—in effect a vocal company bulletin—is sent to all employees in Jewel stores just before the stores open each morning.

The lounge also boasts a television set, a piano, and a tape recorder.

The second floor, housing top administrative offices, the machine accounting room, the drafting room, and the law library, preserves the same clear, open look found on the first floor by the use of the glass panels to set off the few private offices, and the generous amount of free space given each desk. Moreover the look of trimness is accentuated by the fact that all units are approximately desk height. Each of the L-shaped desk units has whatever files the worker needs for his particular work nearby. General files do not exist. The Jewel slogan as far as paper retention is concerned is "Ditch It, Don't Switch It", and the results are apparent in the shipshape look of the entire office. Dead storage papers are held in another Jewel office at Barrington, Illinois.

Even the law library follows the same general pattern of low harmonious groupings. Occupying the center of the second floor the library is actually an open rectangle of bookshelves the same height as the surrounding desks.

The clear look is further preserved by the absence of wastebaskets. Each of the custom-designed desks has its own self-contained "wastebasket" drawer.

The entire office is wood-paneled, with some service facilities concealed by sliding panels in the bleached walnut walls. Thus, various vending machines carrying candy and cigarettes

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Office of the Year
Award of Merit

(for offices designed for more than 500 employees)

The $3,500,000 air conditioned Atlas Building is three stories high at center with two-story wings, on a sixty-two acre tract near Wilmington, Delaware.

Atlas Powder Company

Offices at Wilmington, Del.

WHAT SHOULD an office building be? A handsome building first of all, large enough to meet company needs, into which the various activities of the office can be fitted? Or a streamlined and efficient office layout plan, around which a building is then constructed?

The traditional answer, of course, is the first one. Most companies planning a new building fit their activities into rigid architectural plans, with perhaps a few architectural compromises to accommodate essential office activities. But almost invariably, architectural plans are drawn first; office planning and layout is adapted to the plans.

The possibility that this may not be the right way to build an office building, can indeed be an expensive and relatively inefficient way to do it is suggested strongly by the new offices of the Atlas Powder Company, near Wilmington, Del. These offices were first projected under conventional methods—tentative plans were drawn for a building that would house all Atlas clerical work. The costs projected for construction were so high that Atlas hesitated about the whole building venture. It was only when the problem was attacked from the other end: planning office layout for maximum efficiency and straight-line work flow that it was found all Atlas activities could be accommodated in so much less space than the original requirements that a new building was obviously economical.

In effect what Atlas did, with the aid of R. K. Gad, director of the Office Planning Division of Shaw-Walker, was lay out the most efficient working arrangement posible for Atlas office activities, after which the Atlas architect drew the plans for the building which serves as a shell for these activities.

Savings achieved from the unorthodox attack on office construction were so great that the company which at first had hesitated about building an office at all was enabled to put in such recreational facilities for employees as a swimming pool, tennis courts, and a separate cafeteria and recreational building.

Atlas was formerly housed in rented quarters in downtown Wilmington. Forced to move because the company owning its office building needed more space, its original architectural estimates called for a building of 137,000 square feet. The company felt that such a large building was economically unsound but decided to call in Gad to find if any space could be eliminated at all.

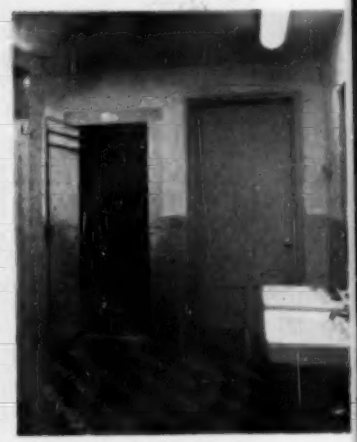
Plans completed in month

Shaw-Walker's planning group (a completely independent activity within Shaw-Walker) accepted the job on May 1, 1953, with a deadline for plans to be presented on June 1. Gad and his team immediately began an analysis of Atlas clerical operations as the first step in planning space and work flow arrangement for the new office. This was completed on May 7. At the meeting that day with Atlas management, 13 specific proposals were put forward by Gad and his associates as a basis for the plans to be drawn. These proposals ranged from standardizing the types of equipment used within the office, to centralizing service

Executive office features ceiling-to-floor paneling, blending of light and dark woods. Upholstery is in fabric and leather.

Maximum of light and space, efficient equipment, characterize office work areas throughout building

Library offers both technical and recreational reading for employees



Executive washroom boasts showe

Company cafeteria provides employees with well-planned, economical meals

departments, and moving some departments from one operating division to another. They even provided for elimination of a private dining room in favor of one cafeteria for both employees and officers.

Management agreed to each of the thirteen proposals, and detailed layout plans were begun on May 8, and were completed on May 29. On June 2, presentation was made of the detailed plans, and the building architect, G. Morris Whiteside II, of Wilmington, agreed that a building could be constructed around the plans prepared by Gad and his associates.

The building committee, approved the detailed plans, but would line management? One of the sharpest reductions in space requirements achieved through the Shaw-Walker plans was won by reducing to an absolute minimum the number of private offices; seventy per cent of private or semi-private office space originally allocated was deleted. Departments were being shifted in the plans from one authority to another. Individual departmental services were being centralized.

The line management was sold, in a series of individual interviews with Gad and Atlas top management held in a Wilmington hotel room. By June 7 the planners were ready to begin to fill in all details on their first plans. By the fifteenth, they were able to present their complete plan for the interior treatment of the office, including columns, floor, wall, and color treatment, and by the 23rd of June, the architect had accepted all their suggestions and agreed that a workable building could be built around them.

Gad's services did not end there. He advised the publicity campaign used to sell the new office to company employees, many of whom were at first reluctant to move from downtown Wilmington; he advised the recreational facilities that the company finally built, and he suggested the plans used to sell the building project to a suburban community which had always previously refused to permit office building construction.

What does it look like, this unorthodox office which is such a success? It is a clean-lined functional building, with a three-story center section and two two-story wings. A covered corridor extends backward from the center wing to the employee cafeteria and recreation facilities, which are housed in a separate building. Thus, the company has open space between its main building and a subsidiary building that allows for future expansion of office space if necessary. Within, the layout is plain and functional, but roomy. In no case have good working conditions been sacrificed to conserve space. The almost complete elimination of enclosed space has given many functions more room than is usual.

In the introductory statements made with the letter of transmission accompanying the Atlas layouts, Gad wrote: "1. A new building should provide space that can be economically built

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Republic National Bank of Dallas

Offices at
Dallas, Tex.

Office of the Year
Award of Merit

(for offices designed for more than 500 employees)

GLEAMING under the bright Southwestern sky, the new forty-story headquarters of the Republic National Bank of Dallas is the sort of building that could only happen in Texas. From gold leaf balustrades on the U-shaped mezzanine above the main banking floor, (itself occupying just a little less than an acre of unobstructed space,) to palatial executive reception suite and private dining room on the top floor of the building, the new Texas bank has deliberately sought and achieved the spectacular on every floor and in every department.

This attitude, which may seem unorthodox in the light of traditional banking practices, has a basis of hard common sense in Texas. The oil and cattle state is enjoying an unprecedented boom. Fortunes are being made overnight. Banks are expanding fast with the burgeoning of the state's wealth; the very rapidity of the expansion has created a fierce competitiveness among Texas financial institutions. The spectacular creates discus-

Rotunda entrance leads to main banking floor; gold-plated mezzanine appears above

Rotunda entrance has escalator, spiral stair

First basement has drive-in deposit area

Executive area features bleached oak paneling; desks of brown mahogany; reception area has scenic wallpaper

A forest of business machines marks the transit department on the fourth floor

sion, discussion makes the name of the bank better known, the better known the bank, the more business it will attract.

Thus, the spectacular features of the Republic National, overlying as they do, an aggressive and consistent sales campaign to win the bank new friends and customers, and a hard core of sound intelligent banking practice, make up a three-pronged attack that Republic National is employing to attract attention and customers.

Designed by Harrison and Abramovitz, of New York, in collaboration with Gill & Harell & Associates, of Dallas, the new bank building successfully strives for the luxury touch from basement motor bank to officers' dining room. A rotunda on the street level (which also houses many of Dallas' smartest shops) is bisected by a double bank of escalators leading to the main banking floor. A graceful circular staircase also winds up to the second floor on one side of the entrance rotunda.

Office of chairman of the board is furnished in Chippendale style.

Trust department occupies most of the office tower section on the fifth level; extends into bank wing.

Gold balcony greets visitors

The main banking floor is perhaps the most dazzling of the bank's many spectacular innovations. Most spectacular of course is the brightly gleaming gold leafed balcony which extends in a horseshoe curve receding from the escalator and staircase entrance. The gilded balcony, unsupported by pillars, seems to hang above the gold and gray terrazzo banking floor that stretches back for 316 feet, and is 110 feet wide. The wide expanse of floor is completely unbroken except for lounge areas in the center, and tellers' cages, and New Accounts and Loan and Discount departments which are aligned against each wall. The officers' platform is located to the rear of the escalator and stairwell entrance, so that the effect of unbroken and uncluttered space is preserved for the visitor's first view of the banking floor.

The mezzanine third floor, beyond the gold-plated balcony, houses executive row for the bank's officers. The varying decor which is so striking throughout the new Dallas bank is first apparent here, where the keynote is eighteenth century. Although each given area of the bank follows a single decorative theme, the range of styles chosen for different areas is very wide, giving a pleasing variety between various areas of the building. Mrs. Reuben N. Knox, of New York, was interior designer for the bank.

The bank proper occupies eight floors of a solid rectangular building extending from the sleek modern tower which is Dallas's tallest structure. The balance of the tower is devoted to rental space, except for the thirty-fifth floor which is given over to the officers' dining room, and the president's own private lounge and dining room.

The fourth floor houses the accounting and the bookkeeping departments, as well as the central station for the pneumatic tube system that ties together all the bank's various departments. The mail department and the Transit Department are also located on the fourth floor. This floor thus has grouped the various activities that make possible the speediest and most efficient movement of the 255,000 individual items of business which the bank handles daily. Checks received one day can be presented for payment the next business day in any major city in the country through the smooth functioning of these tightly grouped departments, and the speedy tempo they have established.

The eighth floor houses one of the bank's most valuable good will assets—the Auditorium, which is equipped with the most modern equipment for every type of presentation, and which is lent free of charge by the bank to any reputable group which wishes to hold a meeting, provided the purpose of the meeting is non-commercial. Since the bank's opening, more than 280 meetings have been held in the

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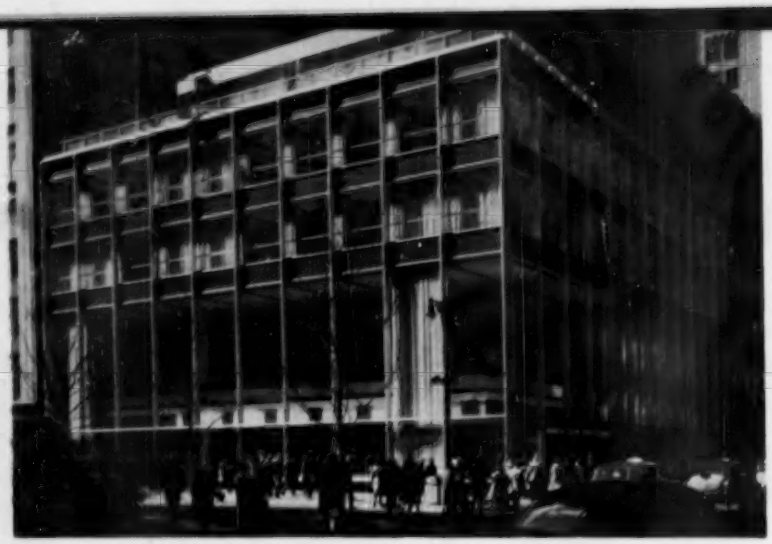


Office of the Year
Award of Merit

(for offices designed for less than 500 employees)

Manufacturers Trust Co.

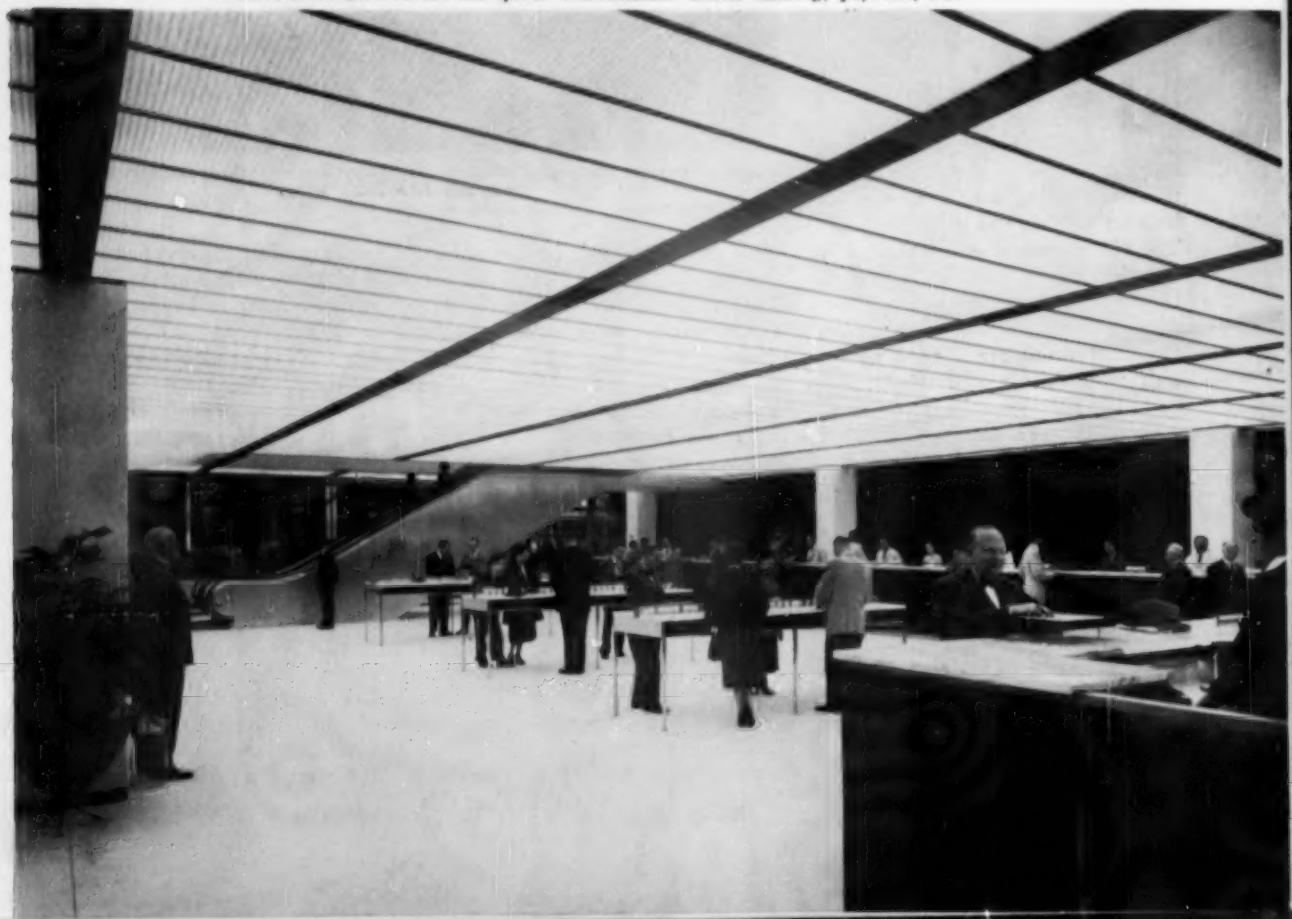
Fifth Avenue offices—New York

THE MANUFACTURERS TRUST COMPANY, reversing almost single-handedly a century-old tradition which decreed that bank buildings be massive and forbidding, is responsible for one of the most unusual and architecturally exciting "showcase" buildings in an era which specializes in buildings that soar, rather than overwhelm.

Its new Fifth Avenue offices in New York City are literally a showcase, walled entirely with enormous glass panes hung curtain fashion from steel beams. Structurally, the building, designed by Skidmore, Owings & Merrill, of New York, is as solid as a fortress, with floors supported by interior structural columns. Yet the glass curtains, hung from the floors rather than set in rigid frames to allow for expansion and contraction, give the entire building an air of grace and lightness that would be spectacular in any structure, that is almost revolutionary in a bank.

Within the building, the first two stories are devoted to the actual routine of banking—check cashing, receiving and paying counters, loan activities. The third and fourth floors contain

First floor area serves for quick transactions: check cashing, payrolls, etc.



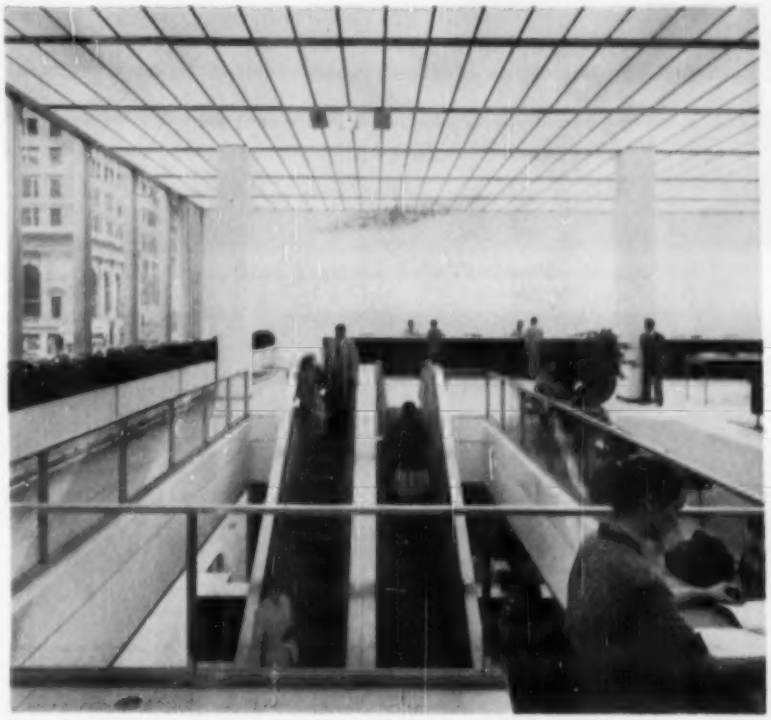
Main banking room on the second floor is designed for spacious effect

efficiently arranged units for the handling of personal loans, mortages and real estate transactions. The fifth floor houses executive offices, including a lounge, a board room and kitchen.

Careful attention to detail has been the major consideration throughout the building. Line, scale, color and material create a beautifully unified visual experience and an air of quiet, graceful serenity.

Visitors and customers alike are impressed by the balance between the efficiency of working lay-out and the pleasant, gracious atmosphere. There is little hard and fast physical division of space. The overall impression is of light and air, with vast open areas.

The banking counters are constructed of marble and macassar ebony; the lack of precise space arrangement here makes it possible to regulate with ease the number of tellers necessary for rush hour business. While an enormous yellow metallic screen divides public and work space, the



Above: escalator from first to second floor. Below: Bookkeeping department on third floor

President's office, on top floor of the five-story, glass and aluminum building

Six interviewing offices assure privacy for personal loan transactions

unity of that space remains intact, and there is none of the feeling of rigid barriers so often found in banks.

Despite the fact that the building is a glass case, seemingly vulnerable to glare from the outside, it is shielded by the tall buildings surrounding it, and is further protected by having no reflectivity. Clever designing of the interior ceilings is partly responsible for this. The ceilings are made of thin corrugated plastic, above which are thousands of cold cathode tubes. Thus the interior brilliance offsets the exterior glare of sun and sky. It is also because of this combination that

(*To page* 80)

In foreground, recreation and lounge area for employees; background, employees' lunchroom

At night, the house that labor built—headquarters of the International Brotherhood of Teamsters—glows and sparkles on the edge of Capitol Hill in Washington, D. C.

International Brotherhood of Teamsters

Offices at Washington, D. C.

Office of the Year Award of Merit

(for offices designed for less than 500 employees)

THE FACT that modern unions are themselves big business, as well as potent political forces, is underlined by the quarters and the location of the new headquarters office building of the International Brotherhood of Teamsters.

Executive center for the world's largest union, with 1,400,000 members, the handsome four-story building, designed by Chicago's Holabird & Root & Burgee, embodies both luxury and top efficiency in one spectacular package.

Most striking feature of the exterior of the new building is the "picture window" effect achieved by the use of blue-tinted glass set in bronze frames

Use of draw drapes and angled walls gives President's office extra dimension, separation of desk area and comfortable conference corner.

Entrance lobby and reception room on first floor are glass walled on street side and provide contrast by use of light and dark marble opposite entrance

Conference room features custom designed arrowhead-shaped table

Penthouse lounge for employees overlooks plant-lined canopied terrace

for the entire front facade on the second and third floor levels. The fact that the two glass-walled floors are projected forward slightly from the main facade, and the color contrast of the blue tinted glass against the white Georgia marble of which the building is constructed, adds to the dramatic effect.

The use of plain glass to band the first floor gives the entire massive structure an appearance of almost floating in the air.

The aura of wealth and power suggested by the exterior is preserved in the interior of the new building. The visitor approaching the building walks up entrance steps flanked by flagstone terraces. He enters a large and handsome entrance lobby, which aside from the glass street wall, has walls of light marble, relieved just opposite the entrance by a projecting panel of dark St. Laurent marble. The lobby floor is dark terrazzo; the lobby columns are faced with Venetian glass tile mosaic. Interior planting areas seem to bring the landscaped terraces through the front glass wall into the lobby proper.

The rich tones and surfaces of the lobby are emphasized by accent lighting from spotlights in the ceiling.

The remainder of the first floor is given over to meeting rooms, a bronze screened checkroom, and the elevator well. Of the meeting rooms, by far the most impressive is the main meeting room, which has been designed as a theatre capable of seating 500 persons. The theatre is not only equipped with motion picture projection equipment; it can even be used for Cinemascope showings.

General offices are carpeted and wood-paneled, with soundproofed ceilings

While dwarfed by the main meeting room, the remaining first floor conference rooms would be envied by many of the country's powerful corporations. Panelled in oak and walnut, each has an exterior wall of clear glass opening on the landscaped terrace.

The second, third, and fourth floors of the building are given over to general and executive offices. Carpeting and wood panelling preserve the same rich note in these higher floors that is struck so quickly in the entrance lobby.

One of the most impressive features in a generally imposing building is the penthouse lounge above the fourth story. A terrace outside the penthouse, protected from the hot Washington sun by a rooftop canopy, provides a unique recreation area for employees.

Well-equipped duplicating center simplifies problem of Union's heavy communications load with subsidiary offices, individual members

Stock room clears mail and all outgoing supplies to local unions and councils

An adjoining small kitchen is used for coffee breaks.

The new offices represent a trend within the union toward tighter centralization of all Teamster activities. Thus, the new building houses not only the International officers and their chief aids, but also has office space for each of the union's 16 operating divisions, as well as working areas for publicity, research, a library, and general clerical operations.

Functioning mainly as an executive and administrative center, the new building has a comparatively small general office. But there is no line of demarcation between the luxuriousness of the private offices and meeting rooms, and the general office area. That, too, is carpeted; that too has rich draperies. All interiors were furnished by the Office Equipment Company of Chicago.

Record storage rooms, as well as mailing, receiving, and shipping rooms are located in the basement as is a fifty-car garage. Three electronically controlled automatic elevators, and one service elevator serve the buildings.

Located as it is, adjacent to the nation's Capitol, with that gleaming white structure visible from its office and penthouse windows, the new Teamsters office is tangible and dramatic proof of the tremendous increase in prestige and influence that has been achieved by the American labor movement in the past few decades.

Suppliers' List

ADDING AND CALCULATING MACHINES: Burroughs Corp., Remington Rand, Inc.
BOOKKEEPING MACHINES: Remington Rand, Inc.
DICTATING MACHINES: Thomas A. Edison Co.
INTERCOMMUNICATING SYSTEM: Webster Electric.
FILE CABINETS: Remington Rand, Inc., Steelcase, Inc.
PHOTOSTAT: Photostat Corp.
REPRODUCTION EQUIPMENT: Addressograph-Multigraph Corp.
TELEFAX SYSTEM: Western Union.
TIME RECORDING DEVICES: IBM Corp.
SAFES AND VAULTS: Diebold, Inc., Remington Rand, Inc.
TYPEWRITERS: IBM Corp., Remington Rand, Inc.
STEEL SHELVING: Andrews Office Supply Co.
FOLDING MACHINERY: Davidson Corp.
MAILING MACHINERY: Pitney-Bowes, Inc.
MUSIC: Tempo, Inc.
TELEVISION: Tempo, Inc.
CARPETS: Jack P. Schwartz, Chicago.
FURNITURE: Stow Davis, Inc., Steelcase, Inc.

Atlas—

(*From page* 70)

and arranged for the functions of the occupant, and, at the same time, contain a flexibility that lends itself to change.

"2. A building, outside the city proper, should give all of its occupants the advantage of the suburban location. In this respect, we feel that it is desirable to provide an unbroken view of the grounds to as many people as possible. We think that the additional cost of a building that will permit all working spaces to be placed within thirty-five feet of the windows is warranted. We believe that money is well spent that provides better than average public rooms such as cafeteria, recreation rooms, etc."

The proof that you can sometimes have your cake and eat it too is a concrete reality in the new Wilmington office that achieved both of these objectives handsomely, and more than handsomely in the case of the employee recreational facilites—at a cost so much lower than its original estimates for a conventionally built office building.

Suppliers' List

EXECUTIVE FURNITURE AND RUGS: H. Feinberg Furniture Co., John Wanamaker.
OFFICE FURNITURE AND EQUIPMENT: Shaw Walker, I.B.M., Remington Rand, Art Metal, Republic Steel Corp., Allied Steel Products Co.

Manufacturers Trust—

(*From page* 76)

passersby can see into the bank instead of being confronted only by their own reflections in the huge panes of glass.

Another unusual feature of the bank is the three offices set aside on the fifth floor for "visiting firemen". They are accommodations for bank officers from other branches, or banks, and out-of-towners; secretarial and telephone services are provided for those who make use of the offices. Here too is the same air of subtle design and achievement of dignity with a light touch that is characteristic of the bank.

The board room, also on the fifth floor, boasts a beautiful macassar ebony table with a seating capacity of 25 people, and looks out on a graveled terrace lined with potted trees. The table can be reduced to accommodate 12 people for smaller or more informal meetings. The board room, which is also sometimes used for a dining area, has a small kitchen located directly behind it.

Interior design and furnishings were handled by Eleanor LeMaire, of New York.

Perhaps the most apt comment on the new building that is such a shining addition to New York's glittering Fifth Avenue, was made by one of the men who worked on the project. He said that it was more like "jewelry than a building." True as the comment is, it *is* a building, and an efficient and workable one, which may well add new dimensions and new imagination to office construction for years to come.

Suppliers' List

CHAIRS: Edgewood Furniture Co., Do More Chair Co.
DESKS AND TABLES: Huller Furniture Co., The Nahon Co.
DESK ACCESSORIES: Froelich Leather Co., Smith Metal Arts Co., Inc.
PENS: Sheaffer Pen Co.
NAME PLATES: Winters Stamp Mfg. Co.
SOFAS: Huller Furniture Co.
METAL FURNITURE: Security Steel Co., Inc., sold through General Steel Products Corp.
CARPET: Ernest Treganowan, Inc., Kent Costikyan, Inc.
LEDGER DESK and LEDGER FILE: Remington Rand, Inc.
ADDING MACHINES: National Cash Register.
BOOKKEEPING MACHINES: Burroughs Corp.
COMPTOMETRY MACHINES: Monroe Calculating Co.
TYPEWRITERS: Underwood Corp., Royal Typewriter Co.
SHELVING: General Steel Products Corp.
LOCKERS: General Steel Products Corp.

Republic—

(*From page* 73)

auditorium by various Dallas groups, with a total attendance of more than 20,000.

This free use of the auditorium illustrates again the bank's policy of extending itself to give service to its community, and to make itself known and liked by as many people as possible in the community. The same concept is shown in the guided tours which are held by the bank for everyone who wishes to come. These tours, conducted by specially trained employees, are held free of charge, and are completely informal; a tour party departs on a complete exploration of

the building as often as a large enough group to form a party gathers. Five hundred people a day are currently touring the building.

This deliberate attempt to take the bank to the community goes even further, however. Periodic radio spot announcements urge Dallas listeners to come see the new bank, and a whole host of informal gaily illustrated brochures outline specific banking services of interest to the individual and the community.

The concept of taking the bank to its potential customers, instead of waiting for the customers to appear, was shown even in the early stages of construction of the building when special canopies and chairs were provided for the "sidewalk superintendents" fascinated by the building of the tallest structure south of Chicago.

Nor is this aggressive and productive, if unorthodox form of banking, restricted to Dallas and the state of Texas. A network of bank representatives working out of Republic's industrial department are continually on the road trying to attract new industry to Dallas. If a company shows interest in establishing facilities in Dallas, the bank's entire machinery goes into action to provide everything from necessary facts and figures to finding housing and services for the potential Texas concern. In effect, Republic functions as a one-concern Chamber of Industrial Development for the fast-growing Texas city.

Proudly dominating the Dallas skyline, the new bank building is symbolized by the rotating beacon on its gleaming metal tower that casts a beam that can be seen for 120 miles. For Republic is reaching out constantly to its community, its state, and its area to make Dallas the financial capital of a rich new empire, and itself the largest financial institution of Dallas.

Suppliers' List

AUTOMATIC SIGNAL SYSTEM: The Autocall Co.
AUTOMATIC TIME SERVICE SYSTEM: The Audichron Co.
BOOKKEEPING MACHINES: Burroughs Corp.
CALCULATORS: Marchant Calculators, Inc., Monroe Calculating Machine Co. Inc., Friden Calculating Machine Co.
DICTAPHONES: Dictaphone Corp.
ELECTRICAL PROTECTIVE DEVICE: American District Telegraph Co.
INTERCOMMUNICATION SYSTEM: Webster Teletalk.
TIME RECORDING EQUIPMENT: Simplex Time Recorder Co.
ADDRESSOGRAPH: Addressograph - Multigraph Corp.
MAILING MACHINES: Pitney-Bowes, Inc.
MICROFILMING MACHINES: Recordak Corp.
PHOTOCOPY EQUIPMENT: American Photocopy Equipment Co.
KARDEX: Remington Rand, Inc.
TYPEWRITERS: International Business Machines Corp., Royal Typewriter Co.
DESK ACCESSORIES: Froelich Leather Craft Co., Esterbrook Pen Co.
OFFICE FURNITURE: Dallas Office Supply Co., Fetzer Furniture Corp., French and English Furniture Co., Inc., LeFebure Corp., Saybolt & Cleland, Schmeig & Lotzian, Stanley Mfg. Co.
STEEL SHELVING: Dealer Equipment Co.
VAULT EQUIPMENT: Diebold, Inc.
LOCKERS: Dealer Equipment Co.

Jewel—

(*From page 67*)

are located in the office, but they are not visible until they're in use. Sliding panels cover them.

A unique material is used for the floors in all offices—unwaxed cork. The first time unwaxed cork has ever been used in such volume, it was chosen by Jewel after experiments in another office had shown it was durable, comfortable to walk on, and fairly easy to maintain.

Clear and uncluttered as the offices are, they are not in the least austere. This is accounted for mainly by the richness of the materials and color which are so striking at first sight of Jewel—the blending of floor and walls and desks in one warm whole. But other touches have been added to keep the functional look from becoming in any way the grim look. Pictures are used extensively on the walls of general office areas. Small decorative touches such as handsome clocks break the long wall panels. Alternating light and dark color tones in the cork floors give them a pattern appearance.

The basement is not neglected in the Jewel Tea building. Besides housing a garage for company officers' cars, and for company automobiles, it also has a barber shop, which is staffed three days a week, and a store where employees may buy at a discount products distributed by the company.

A further parking lot behind the building accommodates employee cars.

Handsome as they are, the Jewel offices are not just good looking. A definite pattern of good planning underlies the arrangement of departments. Thus the L-shape of the building permits departmental executives to be in close touch with each other, since they are located on the inner arms of the L, and still be near their departments which are grouped across the arms of the L.

Entirely air conditioned, the building has individual zone heat control.

Warm and handsome, yet in every way a model of operating efficiency, Jewel's new home in Melrose Park could serve as a prototype for the "administrative center" which may become so important in the American clerical structure as data processing centers take on more and more of the routine mass of clerical details.

Suppliers' List

CHAIRS: Steelcase, Inc., J/G Chairs, New York.
DESKS: Steelcase, Inc.
FILE CABINETS: Steelcase, Inc.
LOBBY FURNITURE: Harper Richards.
MAILROOM BINS: General Fireproofing Co.
STATIONERY: Horders, Inc.

Prudential—

(*From page 63*)

In line with this policy of decentralization, Prudential has opened in the past seven years five regional home offices, each a complete operating insurance headquarters for its area. The Chicago building embodies the wealth of building and office operations experience the firm has gained in its previous ventures.

Within, the building exhibits the same careful planning, and solid good judgment that it does in outward appearance. The Prudential offices are not lavish in any sense of the word, but they are spacious, efficient looking, and comfortable to work in; they derive their own attractiveness from their clean, functional design. Moreover, they have been designed for ultimate flexibility to meet changing company needs.

Thus, three of the floors occupied by Prudential already have installed additional air cooling equipment to offset the cooling requirements that may be met by an ultimate concentration of electronic machine units. The electrical network built into the floor space between stories divides into a two-duct system in which one cell is used for power, and the next for telephone and intercom. Since the cells are on six-foot centers, it is thus possible to reach a power or telephone

outlet on almost any square foot of the entire office area. Movable partitions throughout the Prudential working areas make interior space completely flexible.

The system which provides pleasant music for all general office areas in Prudential can also be used as a public address system.

Another feature of the smoothly-organized Prudential area is the vertical mail conveyor that serves the building. Mail carrying cars are mounted at regular intervals on a continuous chain which receives trays in the upward direction, and discharges them on its trip downward. The entire system is completely automatic: loaded trays placed on a loading station window are automatically moved into the first empty carriage. The carriages also discharge their burdens automatically at any floor designated by the mail room attendants; a dial system at the sending point activates a mechanism at the receiving floor which pulls the particular tray carrying that floor's mail from the carriage as it passes by.

The monumental newcomer to Chicago's skyline is an important new factor in the city's economic life, as well as an addition to its architecture. If the new Mid-America office were an independent company, it would be the fourteenth largest insurance company in North America. Moreover, the solution found by Prudential and the railroad to the long-standing stalemate over building on the air rights above the Illinois Central tracks can instigate a whole new era of modern office construction in downtown Chicago.

In every way, the new Prudential Mid-America Home Office represents a solid and substantial step forward for the company—and for the community.

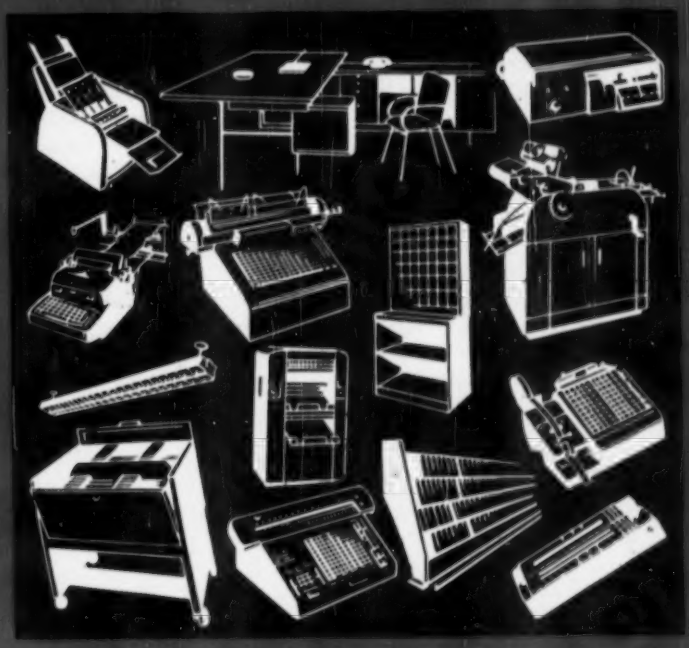
Suppliers' List

ACCOUNTING MACHINES, PUNCHED CARD: International Business Machines Corp.
ADDING MACHINES: Burroughs Corp., Clary Corp., Monroe Calculating Machine Co., Victor Adding Machine Co.
ADDRESSING MACHINES: Addressograph-Multigraph Corp.
BOOKKEEPING MACHINES: Burroughs Corp., National Cash Register Co.
CALCULATING MACHINES: Friden Calculating Machine Co., Marchant Calculators, Inc., Monroe Calculating Machine Co.
CHAIRS: Art Metal Construction Co., General Fireproofing Co., The Orsenigo Co., Taylor Chair Co.
CHECK SIGNER: Todd Co., Inc.
CHECK ENDORSER: Cummins-Chicago Corp.
DATING STAMP: International Business Machines Corp.
DESKS: General Fireproofing Co., The Orsenigo Co.
DICTATING MACHINES: Thomas A. Edison, Inc.
DUPLICATING MACHINES: Addressograph-Multigraph Corp., A. B. Dick Co., American Automatic Typewriter Co.
FILES: General Fireproofing Co., Rol-Dex Div., Hamilton Mfg. Co.
MICROFILMER: Recordak Corp.
NUMBERING MACHINES: Bates Mfg. Co., William A. Force & Co.
MAILING MACHINES: Pitney-Bowes, Inc.
LETTER OPENERS: The Hirscher Co. Inc.
PAPER CUTTERS: Challenge Machinery Co.
PAPER JOGGERS: The Syntron Corp.
BURSTER-IMPRINTER: Moore Business Forms, Inc.
PHOTOCOPY EQUIPMENT: Charles Bruning Co., Inc., Cormac Industries, Photostat Corp., Haloid Company.
SAFES: Diebold, Inc., Herring-Hall-Marvin Safe Co.
SHELVING: General Fireproofing Co., Lyon Metal Products, Inc.
STAPLER: Bates Mfg. Co.
TYPEWRITERS: International Business Machines Co., Royal Typewriter Co., Underwood Corporation.
SORTERS: LeFebure Corp., Remington Rand, Inc.
VISIBLE RECORD EQUIPMENT: Acme Visible Records, Inc., Remington Rand, Inc.
INDEX SYSTEMS: Remington Rand, Inc.
COMPOSING MACHINE: Ralph C. Coxhead Corp.
CARPETING: Alexander Smith, Inc., Mohawk Carpet Mills, Inc., Nye-Wait Co., Inc.

1950—Award Winners—1954

For offices designed for more than 500 persons	*For offices designed for less than 500 persons*
1950	
"Office of the Year" Award	
John Hancock Mutual Life Insurance Company Boston, Mass.	Phillip Morris & Co., Ltd. New York, N. Y.
Awards of Merit	
General Petroleum Corp. Los Angeles, Calif.	Cresap, McCormick & Paget New York, N. Y.
Mutual Life Insurance Co. New York, N. Y.	First Federal Savings and Loan Association Chicago, Ill.
1951	
"Office of the Year" Award	
United Nations Secretariat New York, N. Y.	Foote, Cone, & Belding Chicago, Ill.
Awards of Merit	
Dun & Bradstreet, Inc. New York, N. Y.	Northwestern Mutual Fire Ass'n. Los Angeles, Calif.
Farm Bureau Insurance Companies Columbus, Ohio	First National Bank & Trust Co. Tulsa, Oklahoma
1952	
"Office of the Year" Award	
Lever House, Lever Bros. Co. New York, N. Y.	The Sacramento Bee Sacramento, Calif.
Awards of Merit	
Prudential Insurance Co. of America Houston, Texas	Pan American Life Insurance Co. New Orleans, La.
United States Steel Corp. Pittsburgh, Pa.	Toledo, Peoria & Western Railroad East Peoria, Ill.
1953	
"Office of the Year" Award	
Aluminum Co. of America Pittsburgh, Pa.	The Mennen Co. Morristown, N. J.
Awards of Merit	
E. I. du Pont de Nemours and Co. Newark, Del.	Associated Grocers Co-Op Seattle, Wash.
The Texas Co. New Orleans, La.	Brown Shoe Co. St. Louis, Mo.
1954	
"Office of the Year" Award	
General Foods White Plains, N. Y.	Calumbian Carbon New York, N. Y.
Awards of Merit	
Celanese Corp. Charlotte, N. C.	Standard Federal Savings & Loan Association Los Angeles, Calif.
Utica Mutual Insurance New Hartford, N. Y.	Thomas & Betts Elizabeth, N. J.

TOOLS OF THE OFFICE



A review of current office equipment

by Robert Beeman, Managing Editor, *Office Management*

IT HAS BEEN some years since this magazine chose the title "Tools of the Office" for its monthly series of reviews of office equipment. In taking a look at the status of office equipment at the beginning of 1956, it seems especially appropriate to reflect on what is actually implied by that title.

Too often, it appears, an office will decide that it wants a calculator, or an accounting machine, or an item of duplicating equipment, without really being sure that the particular equipment will actually do the job the company wants done. This is not to say that the equipment is inadequate. Rather it is to object to that point of view that assumes that a job can be fitted to the machine, rather than the machine to the job.

Office equipment, in other words, should be regarded as tools with which to do a job, and jobs should not be invented or distorted merely to justify the purchase of a machine. The emphasis, in short, should be on systems rather than on equipment.

On the other hand, a new machine will often make possible changes in systems that had never been thought of before, or at least were not feasible until the machine was put on the market.

For example, certain new equipment makes it possible for management to keep a running account of its inventory status, or to know precisely how its sales in a given region are progressing. The information can now be supplied daily—perhaps even hourly—with modern equipment. Thereby management has acquired new controls that permit it to take action faster than it could before. It can do a better job. This would not have been possible without the machine.

This example should suggest an important principle. A new machine may do a given job faster or more accurately than it has been done before. Perhaps this is important; perhaps it isn't. Perhaps, in lieu of, or in addition, to these accomplishments, it offers management new access to

kinds of information it couldn't have before. This may be of supreme importance.

There is a tremendous urge in today's office to mechanize all possible operations. New developments make it possible to transfer almost any clerical procedure to mechanical, and even automatic methods. But the overriding question must continue to be—is it economically sound? Does it justify the cost?

This principle is simple enough to state. Yet it is often difficult for management to anticipate all the costs in mechanizing—or not mechanizing. It is true that the cost of a machine may be readily calculable, including maintenance, service, depreciation, and supplies for it. It may be easy to figure the cost of labor involved in operating it, as opposed to the salary costs incurred in following some other procedure. The cost of space to house the equipment may be measured against the space required for alternative operations.

But there are subtler factors. A system introduced in one department may influence the operations of another. For example, a small company may find that it could save money in the storage of certain legal records by microfilming them, if it weren't that the volume was too small to justify the cost of microfilming equipment. At the same time, it may find that it could save itself time and effort in its billing operations by microfilming original sales slips and sending the originals to the customer instead of itemizing the transactions on the statement; yet the volume of operation again does not warrant the cost of microfilming. When the two operations are considered together, however, the possible savings from each may very well combine to justify investing in the equipment.

In other words, management today is beginning to realize that it cannot really afford to look on its diverse operations as separate and independent. It is beginning to appreciate that a business is often greater than the sum of its parts. It is becoming aware that there are opportunities for savings never before observed, by the process of "integrating" many individual operations into a large overall plan.

Accordingly, the systems expert is growing in importance, for he is likely to have a better view of the total operation than does the department head. Time and motion studies are now being seen in the office as well as in the factory. Business forms are being redesigned to serve multiple functions, rather than merely one or two. New machines are being created to perform new jobs. Above all, the old concepts of departmental boundaries are falling, for true integration means that each department must be coordinated with every other.

Throughout the present excitement about automation in the office, the manufacturers of office equipment have been busy designing new machines and new processes. Much of this new equipment can be invaluable if used for the right purposes.

But the public, it sometimes appears, has been so dazzled by the mathematical acrobatics of the giant electronic calculator that it has not always noticed that a newly devised plastic scale may provide it with all the new short cuts it may need to calculate a small payroll most efficiently —and at negligible expense.

The machine, it should be said, is for those who can use it. But it should not be forgotten that many manual methods also can be productive—for those who can use them. Again, the governing factor is the economics of the situation.

In the pages which follow will be found a number of comments on various types of office equipment. It will be noticed that it is this overall view that is stressed—that the emphasis is on "integration" and on system. What is significantly new in 1956 is not so much this thing called automation, but rather the willingness to look at the total picture—to see whether traditional procedures are still right or whether it is time to find a new approach, to be willing to discard old methods if better new ones can be found.

Adding and Calculating Machines

FIGURES are so vital a part of modern business operations that the ability to digest and understand them may be taken as a measure of the ability to operate a business. Naturally enough, figuring devices appeared early in the history of man's inventiveness. At least one of these—the abacus—proved to be so well designed that skilled operators have been able to beat users of the modern adding machine regularly in contests of speed. A modern machine succeeded in outdistancing the abacus only a year ago.

Nevertheless, this modern instrument, which was for so long unable to outrun its ancient rival, is neither a primitive nor a simple machine. Many refinements are found in it. It is a product of a sophisticated technology.

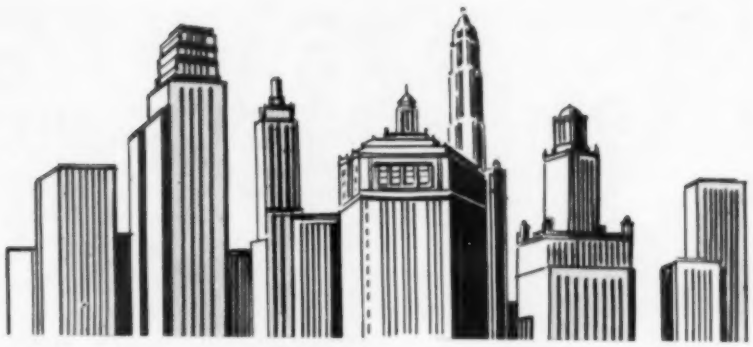
But the record of the abacus does emphasize two facts. This need to figure is no modern development—it was recognized many centuries ago and must be regarded as basic in man's simplest economic relationships. And in a day in which business is speculating about million dollar computers, the durability of the abacus should remind one that a great deal of the nation's day-to-day work still can be performed by relatively simple devices.

This latter point is not insignificant. The day of the automatic office is not yet here. Indeed, if that term is considered to mean an office without human control, the day of the automatic office will probably never arrive. In 1956, in any case, and certainly during the immediate future, it is clear that despite the advances in work-saving and work-speeding equipment, there are, and will continue to be, many offices and many operations in which the principal figuring needs can be taken care of by the use of uncomplicated methods.

Figuring devices range from the simplest charts, tables, and plastic scales to the most involved electronic equipment. In many cases the figuring capacity is allied with some other

In this section:

Adding and calculating equipment, p. 84. Addressing and mailroom equipment, p. 144. Bookkeeping and accounting equipment, p. 136. Dictating equipment, p. 120. Duplicating equipment, p. 102. Filing equipment; office safes, p. 94. Integrated data processing equipment, p. 130. Intercommunication equipment, p. 126. Microfilm equipment, p. 88. Typewriters, p. 116. Acoustical materials; air conditioning equipment; floor coverings; overhead lighting equipment; movable partitions, p. 152.



feature, such as sorting facilities, or a typewriter keyboard. In such cases —in which the equipment may more properly be referred to as a bookkeeping machine, a payroll machine, a data processor, or the like—the equipment will be discussed in other sections of this department. The concern here is with adding and calculating machines as such. Electronic equipment is not included in this section.

It would be improper, however, to suggest that all figuring devices are necessarily machines. Figuring work can in some cases be performed quite adequately—and less expensively—by the use of tables or charts. Some operations are suited to the use of scales of various types, such as plastic disks employed to compute wages due for work periods of various lenghts. The slide rule principle can be adapted to office work, and even the most elaborate rule is quite inexpensive as compared to a machine, if it is appropriate to the work being done.

Of those devices which may actually be classed as machines, perhaps the least involved is a small desk-type unit with a series of rotating dials somewhat similar to telephone dials. Numbers are added by inserting a stylus at the proper point in the appropriate dial and rotating it, much in the manner of dialing a telephone number. This operates mechanical gearing and the totals appear above the dials. This is a small, inexpensive model, not designed for complicated or high-speed figuring.

Among other small units is a unique cylindrical model about the size of a closed fist. Figures are entered on a modified keyboard equipped with dials. While this machine, again, is limited as to speed and capacity, it is capable of performing a considerable number of useful calculations.

More conventional, of course, are the standard desk-size adding and calculating machines, which may be operated manually or electrically, depending on the model. These range from adding machines with simple "ten-key" keyboards to calculators of the "full-keyboard" type, equipped for an astonishing variety of mathematical operations. In some cases, special models are offered for special purposes.

It is significant that manufacturers of this equipment are making constant efforts to improve it The differences between one year's models and those of the year before are not merely those of appearance. The enclosing case of a new model may be more streamlined, it is true, but there are often changes of greater or lesser importance in the inner mechanisms or in the arrangement of keyboard controls.

Most of these improvements have to do with increasing the ease with which the equipment can be operated. Relatively little can be done to increase its actual calculating speed—short of using electronic means, that is—and most of the time-saving features being added achieve their results by eliminating or simplifying steps made by the operator.

For example, a number of methods have been employed to facilitate operation of the equipment by the touch method, which, of course, eliminates a great deal of visual checking. Usually, this is accomplished by grouping as many controls as possible within the reach of one hand. To accomplish such groupings individual keys have sometimes been removed and another control redesigned to perform several functions, depending on how it is operated. Similarly, several keys may be so grouped that they can be depressed individually or, without requiring a separate motion, in combination.

The familiar ten-key keyboard, of course, is well suited to touch operation by virtue of its simplicity and compactness. Additional aids to operation by touch include "contouring" of the keys. In the case of a ten-key keyboard, the middle row of keys may be cut more deeply than the others, to guide the fingers to the "home" row. On a full-keyboard model, odd keys may be more concave than even.

Varying shapes of keys are also aids both to locating by touch and to ease of use. Motor bars, for example, are generally much larger than the other keys, a difference particularly noticeable when modern machines are compared to old models.

Aside from rearranging keyboards to make them handy to use, there has been a constant increase in the number of features available to eliminate operator steps. While the operator of a full-keyboard adding machine does not expect to have to press keys to register zeroes occurring in a number (they are printed automatically), the user of a ten-key machine must take them into account. But many models are equipped with "00" and "000" keys to eliminate extra strokes when multiple zeroes are required.

Various means have been introduced to simplify multiplication. For most practical purposes, multiplication is nothing but repeated addition, and it can be accomplished on the most elementary adding machine. But a number of "short-cut" methods are offered.

The essence of the short cut lies generally in finding some means whereby the multiplier need only be entered once on the keyboard, with the repetitive addition being directed automatically. The multiplier may be entered in a separate set of keys, or by means of a telephone-like dial, or by other methods. One fairly recent device makes use of a line of quite small keys, placed close together; instead of pressing the individual key desired, all keys up to and including

the selected key are pressed; this permits compactness in the design. Even on the simplest adding machines, the use of a "repeat" key eliminates re-entering the multiplicand for each successive addition.

Other time-saving features consist of making certain operations automatic. Some of the features found on modern machines include automatic half-cent round-off, automatic single-entry squaring, automatic clearing, and automatic credit balances (printed in red).

A particularly vexing problem—the placing of decimal points—has been attacked in various ways. Certain of the newest machines provide for automatic placement of the decimal point at all stages of the calculation, showing it on the keyboard and all appropriate dials.

The features of the larger calculators are much too various and involved to discuss here, but the use of "memory" registers, duplex features, special keys, and other aids to calculation make them astonishingly versatile. The capacities of some of these machines are quite extraordinary, so much so that it is not unusual for an alert bookkeeper to come up with a new operating short cut that the manufacturer himself had not discovered.

Probably the most important developments in the manufacture of adding and calculating machines during the last year or so have been those which equip them to read or create a "common language" medium, such as punched paper tape, for use in integrated data processing systems. The adaptation of conventional office equipment for use with such a common language medium makes it possible to record data in a permanent form as a by-product of normal operation, and, most important, can eliminate the need for subsequent copying of that information. This provision for automatic repetition, of course, is the fundamental principle of integrated data processing.

IDP is discussed elsewhere in this department. The important fact here is that any adding or calculating machine which can produce a record of its computations—or of the results of those computations—in a form in which it can be copied automatically by another machine brings important opportunities for automation to the areas in which such machines are customarily used.

In any case, a number of otherwise conventional adding and calculating machines are now being offered with tape punches. Other machines are available which can be operated automatically, taking inputs electrically. The controlling signals can be sent from a variety of sources and it is of special relevance here that the signals may be derived from tape readers. Because other data stored in common language media, such as punched cards and magnetic tape, can be converted to punched tape form, the equipment can be operated, directly or through a converter, from punched tape typewriters, computers, production counting devices, digital weighing scales, and other kinds of equipment. The opportunities for using ordinary adding and calculating machines with automatic controls are thus practically unlimited.

Numerically, of course, machines of this type make up a very small percentage of the total number in use today. Probably there will be a very large number of offices that will have no immediate need for such equipment, since it is of little use unless it fits into an overall pattern of automatic data processing.

However, the fact that the equipment is now available is of great importance. Not only does the equipment exist, but there is a strong desire to find ways to use it. It may be assumed that the common language calculator will become increasingly important, and that the trend to automation which is now gathering force so impressively will ultimately affect even the very small companies. Even though they may not be in a position to own or rent a high-powered battery of automatic data processing equipment, it is probable that they will ultimately need to have access to equipment which can *originate* data in a form for automatic processing. Service bureaus quite possibly will serve those companies too small to own the equipment itself. In any case it is important to recognize the new trend and to examine the possibilities it offers.

The Manufacturers

Following is a list of the principal manufacturers of adding and calculating machines. The letters in parentheses after each name indicate types of equipment offered, according to the following code:

E—electric models

FK—full-keyboard models

IDP—models which create or read a common language medium, or are otherwise suitable for use in integrated data processing systems

M—manual models

NI—No information on current models

P—models producing printed records of their computations

S—special models

TK—ten-key keyboard models

Addo Machine Co., Inc., 145 *West 57th St., New York* 19. (*E, M, P, TK*)

R. C. Allen Business Machines, Inc., 678 *Front Ave., N.W., Grand Rapids* 4, *Mich.* (*E, FK, M, P, TK*)

Alma Office Machine Corp., 440 *Fourth Ave., New York* 10. (*E, M, P, TK*)

Barrett Adding Machine Div., Lanston Monotype Machine Co., 24*th & Locust Sts., Philadelphia* 3. (*E, M, P, TK*)

Burroughs Corporation, 6071 *Second Ave., Detroit* 32. (*E, FK, P, TK*)

Clary Corp., 408 *Junipero, San Gabriel, Calif.* (*E, FK, IDP, P, TK*)

Classic Calculators, Inc., 19 *West 31st St., New York* 1. (*E, P, TK*)

Curta Calculator Co., 4755 *W. Madison St., Chicago* 24. (*M, S—small cylindrical hand models*)

Facit, Inc., 404 *Fourth Ave., New York* 16. (*E, M, P, TK*)

Felt & Tarrant Mfg. Co., 1735 *N. Paulina St., Chicago* 25. (*E, FK, M, P, TK*)

Forster Mfg. Co., 1425 *McLean Blvd., Wichita, Kansas* (*S*)

Friden Calculating Machine Co., Inc., 2350 *Washington Ave., San Leandro, Calif.* (*E, FK, IDP, P, TK*)

Johnston Adding Machine Co., 13343 *Sherman Way, North Hollywood, Cal.* (*E, P, TK*)

Lanston Monotype Corp., SEE: *Barrett Adding Machine Div.*

Lightning Adding Machine Sales Co., Inc., 2306 *W. Slauson Ave., Los Angeles* 43. (*S—small stylus-operated machines*)

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Marchant Calculators, Inc., 1475 *Powell St., Oakland* 8, *Calif.* (*E, FK*)

Monroe Calculating Machine Co., 555 *Mitchell St., Orange, N. J.* (*E, FK, IDP, M, P, TK*)

The National Cash Register Co., Main & K Sts., Dayton 9, *Ohio.* (*E, FK, M*)

Norwegian Export Council, The Norwegian American Chamber of Commerce, Inc., 290 *Madison Ave., New York* 17. (*NI*)

Oerlikon Tool & Arms Corp. of America, Business Machines Div., P. O. Box 3049, *Asheville, N. C.* (*E. M, P, TK*)

Olivetti Corp. of America, 580 *Fifth Ave., New York* 36. (*E, P, TK*)

Plus Computing Machines, Inc., 5 *Beekman St., New York* 1. (*E, FK, M*)

Precisa Calculating Machine Co., Inc., 375 *West Fourth, South, Salt Lake City.* (*E, M, TK*)

Regna Cash Register Co., 175 *Fifth Ave., New York* 10. (*E, FK, M, P*)

Remington Rand, Div. of Sperry-Rand Corp., 315 *Fourth Ave., New York* 10. (*E, M, P, TK*)

Smith-Corona, Inc., 701 *E. Washington St., Syracuse* 1, *N. Y.* (*FK, M*)

Swift Business Machines Co., 51 *Church St., Great Barrington, Mass.* (*M, TK*)

Underwood Corp., 1 *Park Ave., New York* 16. (*E, M, P, TK*)

Victor Adding Machine Co., 3900 *N. Rockwell St., Chicago* 18. (*E, FK, IDP, P, TK*)

Microfilm Equipment

MICROFILMING is often regarded primarily as a means of saving space. It is true that microfilming can cut the physical volume of records by photographing documents on film at a highly reduced scale. But this view considerably underestimates its real potentialities.

In fact, space saving is no longer its big selling point, for records management specialists have been teaching the public to eliminate unnecessary records at the source, to destroy records that have served their purpose, and to transfer inactive but essential records to inexpensive storage.

But this has not reduced the importance of microfilming. On the contrary, it has brought about a new emphasis on the great possibilities it offers as a tool of business. The office is just beginning to realize that the microfilm camera can be just as important to an accounting department as a billing or calculating machine, and that it may actually replace some of this equipment.

One of the possible uses has been referred to previously in this department. That is the use of microfilm to eliminate descriptive writing in the preparation of customers' statements. This particular application assumes that individual charges have originally been written down on separate slips. For example, meals in clubs, sales in stores, long distance calls as recorded in telephone company offices, are commonly written down separately as they occur.

In sending statements, a company will naturally wish to justify each charge. If it is desired to itemize each charge on the statement, the relevant information must be copied onto the statements individually. The original slips, of course, remain with the company for its records.

However, a more modern approach is to microfilm the original slips instead of describing each transaction on the statement. The microfilm record is retained by the company, and the original slips are forwarded to the customer along with the statement. Several benefits are immediately apparent:

(1) The customer is presented with authentic evidence of his purchases. Many customer inquiries about charges result from failure to remember or identify a purchase from the abbreviated information on a statement, and presentation of the original material is calculated to satisfy him and spare the company an unnecessary call.

(2) The company itself is saved the need of transcribing information from the slips to the statement, which very much reduces the time and effort required in billing.

(3) The company files, consisting of minute microfilm records instead of a mass of papers, are made very much more compact.

For some time now, libraries in New York, Philadelphia, and other cities have been using microfilm to keep the records of books borrowed. At the outgoing desk, the borrower presents his own card. This card, the usual book card, and a dated "transaction card," are simultaneously microfilmed. The procedure is very rapid, and it requires no inconvenience. The library, which formerly had to stamp the date and record the borrower's number on the book card by hand, is saved this manual effort; moreover, instead of keeping a file of book cards, it retains a compact microfilm record of all book transactions. The film is easily checked when the books become due to see which, if any, are missing, and which borrowers are responsible.

Microfilming also offers methods of centralizing various accounting procedures. For example, the accounts receivable ledgers in branch offices can be microfilmed and the film sent to the main office. Thus the home office can review and analyze the records of widespread operations conveniently, and the branches can themselves be spared the preparation of special reports.

Another fact which is beginning to be appreciated is that microfilm cameras can be made as small and light as a portable typewriter. This makes it possible to carry a camera to outlying offices to record documents of interest. Centralized control, as described above, might be accomplished by some such means in small companies not large enough to have microfilm cameras in each branch office.

Particularly useful applications of the portable camera technique can be made in certain types of consulting and auditing work. A certified public accountant, for example, can record his clients' documents for review at his own offices. Aside from permitting the accountant to work in his own offices, this technique reduces the time he must spend working with the original records, thereby cutting down the inconvenience to his client.

Space savings offered

Uses such as these, it is clear, are far more sophisticated than the mere reduction of space required for records. Nevertheless, the space problem continues to be important.

It should be pointed out that the contents of a standard four-drawer filing cabinet can usually be recorded on two rolls of 16 mm. microfilm. Taking into account the storage capacity of conventional microfilm cabinets, one drawer of such a cabinet can be used for the microfilmed records of from 30 to 35 conventional filing cabinets. Interpreted further, these figures mean that a seated operator can have access, from her chair,

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to the equivalent of files that would otherwise cover about 5,000 feet of floor space.

It should hardly be necessary to observe that rental of office space is costly, and that a saving such as is indicated by these figures can be extremely important.

One of the most important uses of microfilming, of course, is to provide protection for valuable records, by creating duplicates of them for storage in a safe place. Alternatively, the originals can be sent to protected storage while the microfilm copies are retained for active use.

Since either the originals or the copies can be used as the active records, there are several factors to be considered in determining the actual use of the microfilm. If the need for space reduction is of overriding importance, naturally, the originals should be removed from the office, leaving the microfilm as the active records.

On the other hand, records on roll microfilm are frozen into a permanent sequence and records on related subjects are not necessarily grouped together. In such a case, the originals may be retained for active use. But this problem is being met in another way—by "unitizing" the filmed images. Unitization refers to the mounting of single microfilm frames or groups of related frames on cards so that they can be sorted and rearranged as desired.

Special cards are used which provide a frame for the film. These cards may be used as ordinary file cards, but microfilm can also be mounted in tabulating cards. By this means, the cards can be punched and used in numerous accounting and statistical operations, in the manner of ordinary punched cards. But they contain, in microfilm form, far more information than could be recorded in the cards in any other way. This method also provides means for indexing and sorting blueprints and drawings, in addition to allowing compact storage of the information.

Unitization is valuable for permitting rearrangements of records as desired. Thus material on the same subject can be grouped together, whereas in roll microfilm, records created after the original filming must be filed separately.

It is true that rolls of microfilm can be cut and spliced, but such a procedure may reduce their legal value, especially if the film is used as evidence of the sequence of records.

Actual cutting of the film itself, however, is not always necessary to achieve unitization. Instead, black-on-white copies can be printed from the film, the same size as the original film image. Such positive copies can be printed directly on cards or on strips which can be pasted to ordinary filing cards. Positive images are usually opaque and are read by means of an opaque reader, rather than the customary microfilm reader.

In addition to the uses suggested above, microfilm provides a fast and inexpensive method of making copies. It is much faster than other copying methods, and the film is not expensive. The copies, of course, are completely accurate.

In summary, therefore, it can be said that microfilming can be very helpful in a great many operations in which compactness of records, accuracy of copies, high speed of copying, reduction or elimination of manual or machine copying or posting, recording of items in sequence, or protection of records by creating duplicates of them is of importance.

It is sometimes suggested that locating microfilmed records is not as easy as it should be. In general, the answer is to set up an adequate indexing system. This is not as involved as it sounds. It merely means adapting the principles used in the conventional files to microfilming.

But there are certain points which must be considered:

Since the material cannot be rearranged once it has been filmed, the filing arrangement must be planned in advance. If the material must be used in various rearrangements, filming on rolls is not suitable, and unitization may be necessary, or the microfilmed records may be used only as "security" copies. Material to be filed by a numerical, or chronological sequence, however, is readily used in microfilm form. The important thing, obviously, is that the material be in correct sequence before it is filmed.

Indexing may be accomplished in either of two basic ways. If the equipment is provided with a meter, giving continuous measurement of the film length at any point, material may be indexed simply by noting on the index the meter reading at any appropriate points in the record—such as the first item for a given date, "round" numbers in numerical sequences, etc.

If the metering method is not used, it is customary to record material that is conspicuously different from the other records, so that it may be spotted quickly as the film is run.

One way of doing this is to feed a strip of white paper, such as adding machine tape, into the camera at intervals during the recording. Such intervals should be intelligently chosen, of course; as with metering, round numbers, or key dates may serve as reference points.

The tape, or its equivalent, is called a "flasher". It is photographed as if it were a document.

As the film runs through the reader, the sudden blank area flashes clearly into view. Assuming a proper record is kept of the flashers, the location of any item may be determined, within a relatively few feet of film, by counting flashers.

In addition, a sheet of paper containing filing information may be fed into the camera immediately following the flasher. Such a sheet may correspond to the tabs or file guides in ordinary files, or it may contain such other information as "START" or "END".

Many such sheets are referred to as "targets" and they provide information supplementary to that supplied by the flashers. Unlike the flashers, they are not seen easily as the film moves rapidly through the reader, and the film must be stopped or appreciably slowed. The flashers may be used, however, to call attention to them.

Targets can also serve to inform the user that a document has been fed into the camera out of sequence, or that a record which has been accidently folded in passing through the camera has been rephotographed on some subsequent part of the film. They can also certify that certain records have been destroyed. They can, in fact, be used to carry any information deemed desirable.

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The flashers and the targets do not of themselves provide complete indexing. The remainder of the index is provided by the boxes in which the microfilm rolls are stored. As the boxes rest in a drawer, one edge of each is exposed. This edge has space for writing primary indexing information. In this respect, it corresponds to the labels on file drawers.

Once the desired roll has been located, the side of the box may then be inspected. Here should be recorded information on the number of flashers on the roll, together with identification of the records between each flasher—such as the date or number of the first record following each flasher. Information written on the box side corresponds to that contained in the file guides and sub-guides in a file drawer.

It is seen that by using, in proper sequence, first the edge of the box, then the side of the box, then the flashers and targets, microfilm can be indexed in a manner very closely paralleling that used in conventional correspondence files. As with such files, the detail to which indexing information is provided will depend largely on the frequency of use to which the files will be put. Naturally, very active records should be indexed in greater detail than records used only occasionally.

If microfilm is stored properly, it should be able to last as long as five hundred years, according to the best information available. Normal storage is considered to be at temperatures from 60 to 80 degrees Fahrenheit, in a relative humidity of between 40 and 50 per cent.

Microfilm should *not* be stored in insulated files. The reason is this: the insulation in such cabinets is designed to protect paper records by giving off steam when exposed to fire. Moisture, however, is damaging to film which might otherwise be able to withstand short exposures to heat. Authorities recommend storing microfilm in tin cans with friction lids, these cans to be placed in above-ground fire resistant vaults. Underground storage is not recommended because of the dampness usually encountered.

For guidance, the recommendations of the National Bureau of Standards for controlling unsuitable humidity conditions are quoted:

"When film is stored in air conditioned offices no humidification of storage cabinets is necessary. However, microfilm storage cabinets equipped with trays for salt solution in the bottom of the cabinets are desirable. We recommend saturated sodium dichromate solution with an excess of sodium dichromate (undissolved crystals in solution) for humidification purposes. This salt will maintain 52 to 53 per cent relative humidity in air-tight cabinets at room temperature. If the cabinets are not reasonably air-tight the relative humidity mentioned above will not be maintained.

"Where humidified cabinets are to be used it is extremely important that they have intelligent servicing. In dry weather, as in heated rooms in winter time, the salt solution will evaporate and the water should be replenished from

time to time. In the summer time, during periods of high humidity, the salt solution will take up water and some should be removed from the trays. It is very important to see that an excess of salt is present at all times. If the solution becomes less than saturated it will no longer act as a dehumidifying agent and in extreme cases may give up sufficient moisture to cause the film to become damp and promote the growth of fungus on the film. The optimum relative humidity condition for the storage of microfilm is 40 per cent to 50 per cent."

Microfilm equipment is usually classifiable into one of two categories, not counting accessories: cameras and readers.

Cameras themselves fall into two classes, "flow" cameras and "transport" ("table" or "planetary") cameras.

Flow cameras are designed to photograph documents in motion. The film moves constantly while the unit is in operation, and as a document is fed into the camera in synchronization with the film, a portion of it is photographed as it moves before the lens. The entire paper is not exposed at once, the image being completed on the film only as the last part of the record moves past the lens.

This technique has several advantages. First, it provides for very high speeds of recording. Documents of tabulating card size, if of uniform thickness and flatness, can be recorded, according to some experts, at speeds of between 20,000 and 30,000 an hour. Second, there is no limit to the length of the document to be photographed, other than the length of the film itself. The only limitation as to document size is that imposed by the width of the camera throat, which may be as great as 42 inches. Thus, flow cameras can record documents in a wide variety of sizes and shapes, and some equipment can accept material in fan-folded form.

The transport type more closely resembles a simple camera in that the entire picture is taken at once. This type of equipment, of course, is slower to use, since each document must be placed separately before the lens. However, it is especially useful for recording large items, such as engineering drawings, and it can record material from bound books, whereas flow cameras cannot.

Most office cameras record on either 16 mm. or 35 mm. film. Certain models can use either film interchangeably. Some cameras use 70 mm. film.

It is possible to record both sides of a document simultaneously, side by side on the film, depending on the camera. Cameras so designed are called "duplex" models. Other cameras record one side at a time, but again a variation is possible. In some cases the image can be made on half the film width; in others the full width is required.

The degree of reduction is interchangeable on some models, merely by changing the lens. It is important to select a reduction ratio suitable to the material being photographed. If the original material contains fine print, too great a reduction ratio can make the microfilmed record difficult to read. However, failure to reduce adequately will use more film than is necessary, which is inefficient.

Automatic feeds permit extremely fast loading of flow type cameras, but a good operator can get high speeds from manual loading. However, a number of manufacturers recommend using an automatic feed with a good operator in attendance, since documents to be recorded are often not uniform. To prevent double-loading,

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many cameras have a device to measure the thickness of the material entering the camera. Deviations will cause the equipment to stop. However, if the material varies too much in thickness, this safety device cannot be relied upon.

Another problem is that imperfections in the leading edge of the copy may interfere with proper loading. Leading edges should be straight, flat, and smooth. Where they are not, manual loading may be imperative.

The microfilm itself may be loaded on reels or in magazines. Magazines are more easily changed, but not all models will accept them.

Microfilm readers may also be of two basic types. In both types the film is passed through an optical system which projects the image onto some sort of screen. In one type the screen is opaque and the image is thrown onto it in much the same manner as the image from a conventional motion picture projector. This type of equipment, is described as being of the "direct" type. In much standard equipment, the image is projected from behind, appearing on the reverse of a translucent glass or plastic screen. This type is popular because it is read more easily in a lighted room.

Some readers allow the image, as read, to be rotated as much as 360 degrees. This is a valuable feature, for it is often necessary to turn wide documents sideways in recording them. The rotation of the projected image thus restores them to a convenient reading position.

Readers, like cameras, can be obtained with various optical ratios, the magnification ratios of the readers corresponding to the reduction ratios of the cameras. The interchangeability of lenses varies from model to model. Some readers, like some cameras, have fixed ratios.

Other readers are designed for use with opaque images, and are especially intended for work with unitized microfilm.

Cameras and readers are available in a number of sizes, from large models to portable units.

Accessory to the two basic types of microfilm equipment are the following items, among others: Processing equipment for the developing and processing of the film; processing may be handled outside the office, but office units are available. Enlargers, for making positive prints, at various scales, from the microfilm. Cabinets for the storage of the film; these usually are equipped to provide storage of dehumidifying chemicals.

The Manufacturers

The following list of manufacturers indicates briefly the type of equipment offered. In a few cases, companies which supply specialized microfilming services, such as preparing unitized positive copies of microfilm, have been included. The manufacturers are in a position to advise on systems applications and indexing of microfilm, and should be consulted for any detailed applications.

Types of equipment offered are indicated by codes listed below. In addition, information on manufacturers of microfilm cabinets will be found in the section on filing equipment.

C—Microfilm cameras

M—Miscellaneous

NI—No information available on current products

O—Opaque readers (reading microfilm images on cards, etc.)

R—Microfilm readers (using film)

U—Supplies or services for unitizing microfilmed images

American Microfilming Service Co., 412 Temple St., New Haven, Conn. (NI)

Atlantic Microfilm Corp., 41 Union Square W., New York 3. (M—editing equipment, U)

Burroughs Corp., 6071 Second Ave., Detroit 32, Mich. (C, R)

Cooks', Inc., 207 Lakeview Ave., Blackwood, N. J. (U)

Copycat Corp., 41 Union Square West, New York 3. (M—equipment for making opaque prints from microfilm)

Diebold, Inc., Flofilm Div., P.O. Box 127, Norwalk, Conn. (C, R, U)

Eastman Kodak Co., 343 State St., Rochester 4, N. Y. (C, O, R)

Filmsort, Inc., 50 S. Pearl St., Pearl River, N. Y. (R, U)

Graflex, Inc., 154 Clarissa St., Rochester 8, N. Y. (C)

Graphic Microfilm Corp., 112 Liberty St., New York 7. (NI)

Griscombe Products, Inc., 132 W. 21st St., New York 11. (C, R, U)

Hall & McChesney, Inc., 1233 Oswego Blvd., Syracuse, N. Y. (U)

Micro Record Corp., 225 W. 28th St., New York 1. (NI)

The Microcard Corp., P.O. Box 314, La Crosse, Wis. (O)

Microfilm Corp., 13 E. 37th St., New York 17. (NI)

Microfilming Corp. of America, 11 E. Pleasant Ave., Maywood, N. J. (NI)

Microflex Corp., 1 Graves St., Rochester 14, N. Y. (M—equipment for making enlarged prints from microfilm, O)

Peerless Photo Products, Inc., Shoreham, L. I., N. Y. (M—equipment for making positives from microfilm negatives)

Recordak Corp., 444 Madison Ave., New York 22. (Subsidiary of Eastman Kodak Co.) (C, R, U)

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. (C, R, U)

U. S. Microfilm Co., 868 Main St., Stamford, Conn. (C, R)

York Microstat Corp., 655 Madison Ave., New York. (NI)

Filing Equipment and Office Safes

THE VOLUME of paperwork handled in today's offices is quite appalling. It has changed the status and function of offices markedly in the years since the beginning of World War II. Because of it, large amounts of space are given to preparing, processing, and storing paperwork, greater numbers of personnel are required to handle it, and the number of machines and storage units has increased vastly.

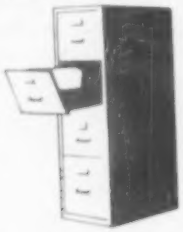
The problem of reducing paperwork and its effects, has been approached in at least two ways. The whole new science of records management has grown up to study and promulgate ways of reducing the number of records before they are created, and of reducing the volume of space, the number of people, and the expense of equipment needed for processing and storing those which continue to be necessary. Inevitably, this approach becomes entangled with systems studies, for there are many opportunities for reducing the paperwork load through redesign of forms and systems.

The other main approach has been by way of attempting to make physical improvements in equipment in order to reduce its bulk or at least to facilitate the handling of the re-

cords. This phase of the battle has been largely undertaken by the equipment manufacturers.

Notable among the space-saving advances are the following:

By redesigning filing cabinets to eliminate waste space, it has been possible to produce cabinets with five filing drawers in the space formerly occupied by four.



By using expanding fronts on file drawers, more records can be stored in a drawer of this type than in an ordinary drawer, because it is not necessary to leave "handling space" between the records.

By using shelf-type filing, more records can be stored in a given area than when cabinets are used. To overcome some of the problems of dust and fire hazard, several new shelf-type files have been designed with doors hinged horizontally, which in some cases can be pushed back out of the way when open or, in others, can be pulled out horizontally for use as working areas. Simple equipment is also offered to make possible the use of ordinary shelving for files. File guides have been specially designed for use with shelf files.

File cabinets, transfer cases, and shelf-type sections can be mounted on rollers which ride on tracks located either in the floor or suspended overhead. By this means the amount of aisle space between storage units can be reduced; access to a rear cabinet is obtained simply by rolling the section in front of it to one side. Such a method greatly increases the number of records stored in a given area by reducing the floor space required for access. It is intended primarily for relatively inactive records.

Within the file, bulk has been reduced by using self-tabbed guides, and, in some cases by using the filed records themselves as their own guides.

Developments intended to facilitate the actual handling of the records include the following:

Mechanization of files. Card files, in particular, are well suited to mechanization. While the models vary in detail, most of them use some method of moving the cards in a roughly circular path, with a working area provided at the point where the circle comes closest to the operator. Most rotation is vertical—like a ferris wheel—but it need not be. In some equipment the cards move toward and away from the operator; in other cases the movement is from left to right, or vice versa. The cards are sometimes attached to a ring; sometimes they ride loosely in compartments and are held in place when out of reach of the operator by some type of belt or retaining band; sometimes they ride unattached in trays which are always carried in a horizontal position. In other cases, the cards are carried in sliding trays arranged in stacks which move vertically, with the desired tray brought to work level at the press of a button. Some of these files are manually operated, but many are electrically powered, with a variety of possible control button arrangements. Some are small enough to be used on a desk-top; others are larger than a desk. Whatever the method, the purpose of the design is to bring the records to the operator, instead of requiring her to go to the records.

Consolidation of records storage and equipment used with it (such as bookkeeping machines) in single work stations, to give an operator full control of her work and to eliminate wasted motions in going to and from the files.

Development of storage equipment specifically designed for work with records of different kinds and/or sizes. For example, if a bookkeeping system is being set up on visible index cards, equipment for storing those cards in a convenient arrangement is available for it. (However, as a practical measure, a certain degree of standardization should be used, to prevent a loss of flexibility should operations change.)

Designing of new types of filing equipment and new types of filing systems. For example, one manufacturer offers equipment and cards which are magnetized in such a way that the cards stand apart, permitting a view of top lines in a portion of the files without the need of separating the cards by hand. Filing systems have been designed in which, by a clever arrangement of cut-away sections and tabs which are part of the cards themselves, cards are quickly located and misfiled cards readily spotted. A number of systems and pieces of equipment are designed to permit random filing, thus eliminating the time consumed in hunting for cards and in replacing them; one of the ways in which this can be done is by notching the bottoms of the cards and filing them in a unit which can make a selection of cards according to the notches in them.

The foregoing is not an exhaustive list of new methods that are available, but it does provide a sampling of the type of approach that is being used.

To clarify meanings of words that often appear in discussions of filing, two words will be defined—"vertical" and "visible," as applied to filing methods.

Vertical filing is a much misunderstood term. It does *not* mean that papers are filed standing vertically on edge. Practically all files, vertical and visible, employ such an arrangement. The term merely means that papers are filed, figuratively speaking, one *above* another, as in a stack. The fact that that stack may be turned on its side does not alter the principle. Vertical filing is that form of paper arrangement in which each paper obscures the one below it. It is also called "blind" filing, which is a more accurate term.

Visible filing, on the other hand, is an arrangement of papers in which at least one margin of each paper is visible without moving the paper in front of it. Sometimes one margin is visible, sometimes two or three. The extent of visibility is sufficient that the record can be identified without having to move the one just ahead of it. Often enough supplementary information is visible that data can be gathered from the files without having to remove any of the records.

Visible files often have taken the form of arrangements of cards in trays or binders, the individual cards usually being held in plastic or other

types of holders, with the bottom margins exposed. To distinguish from this type, some manufacturers use the term "vertical-visible" to indicate a type of file in which cards are placed side by side in banks (single banks being supported loosely by dividers in a tub file), with a side margin exposed in lieu of the bottom margin. Often a diagonal cut is made at the top of the card, providing additional exposed margin area.

In any visible system, the card itself acts, so to speak, as its own individual guide. In some systems the cards are more or less permanently arranged; in others, they are designed to be removed easily for posting, especially machine posting.

Visible systems are generally much less compact than vertical systems, but they offer great facility in their use, because records are easily located.

It will be noted, incidentally, that most vertical files make use of some of the principles of visible filing. For example, a well-ordered file will have an adequate number of file guides. The index tabs used on these guides, and on the folders themselves, are designed according to basic principles of visible filing.

Protection of records is an important matter. The protection of papers against theft is provided in greater or lesser degree by the sturdiness of the file construction and by the quality of the lock. Protection against fire is determined by the quality of the insulation and the cabinet design.

It should be realized that special insulating qualities are required for adequate fire protection. Specifically, the insulation should include some means for maintaining the moisture content of the air inside the cabinet, so that the heat of a fire will cause the interior to fill with steam. If such a steam blanket is not formed, a fire will readily char any papers in the cabinet, just as effectively and completely as if they were put in an oven and baked. Insulated files of good quality, of course, provide for the retention of enough moisture in the insulating material to create a protecting blanket.

The ability of files and safes to resist fires and burglary attempts is measurable in accordance with standards set up by such organizations as the Underwriters' Laboratories, Inc., the Safe Manufacturers' National Association, and other organizations. Compliance with these standards is indicated by the assignment of "labels" to the equipment concerned.

The Manufacturers

In the list which follows will be found the names of the major manufacturers of filing cabinets, transfer cases, shelf filing equipment, tub files, rotary and mechanized files, visible record equipment and systems, and office safes. Filing supplies and systems, except where an integral part of equipment, are not included, for lack of space.

The code symbols in the list are as follows:

FC—filing cabinets

M—miscellaneous (including tub files not used in visible record systems, "portable" files, etc.)

NI—No information available on current products

R—Roller mounted installations, using either floor or overhead tracks

RM—Rotary and mechanized files and manually-operated equivalents

S—Shelf filing equipment

T—Transfer cases

V—Visible record equipment

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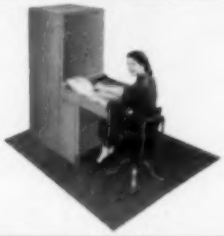

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(From page 96)

Acme Visible Records, Inc., Crozet, Va. (RM, V)

Acorn Products Co., 4605 W. 21st St., Chicago 50. (FC)

Albany Novelty Mfg. Co., 107 W. Canton St., Boston 18. (V)

All-Steel Equipment Inc., 100 Griffith Ave., Aurora, Ill. (FC)

R. C. Allen Business Machines, Inc., 678 Front Ave. N.W., Grand Rapids, 4, Mich. (FC—Insulated)

Amberg File & Index Co., 1627 E. Duane Blvd., Kankakee, Ill. (M—portable and box files)

American Box & File Co., 18 Mangum St. S.W., Atlanta (FC)

American Metal Products Corp., 3864 Laclede Ave., St. Louis 8. (FC)

Arrow Paper Products Co., 502-504 W. 30th St., New York. (T)

Art Metal Construction Co., Jones & Gifford Aves., Jamestown, N. Y. (FC, S, V)

Art Steel Sales Corp., 170 West 233rd St., Bronx, N. Y. (FC, M—portable files, T, V)

Harry K. Ashley, 2305 Cherry St., San Leandro, Calif. (V)

Atlantic Microfilm Corp., 41 Union Square West, New York 3. (FC—microfilm)

Atlas Stencil Files Corp., 16716 Westfield Ave., Cleveland. (FC—cabinets for offset plates, stencils, etc.)

Automatic File & Index Co., 549 W. Washington Blvd., Chicago 6. (FC, T, V)

Bankers Box Co., 720 S. Dearborn St., Chicago 5. (T)

The Bentson Mfg. Co., 634 N. Highland Ave., Aurora, Ill. (FC)

Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave. N.E., Canton 5, Ohio. (FC, T)

Browne-Morse Co., Muskegon, Mich. (FC)

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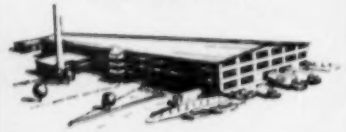

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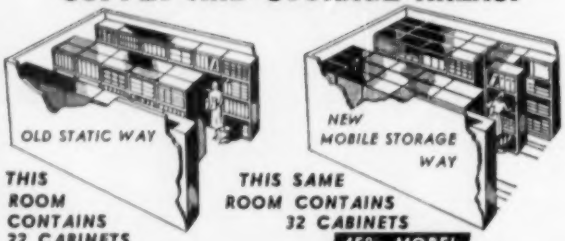

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Convoy, Inc., 3424 Navarre Rd. S. W., Canton, Ohio. (T)

Corry-Jamestown Mfg. Corp., Corry 5, Pa. (FC—including microfilm, S, T)

Craig Machine, Inc., 90 Holten St., Danvers, Mass. (RM)

Currier Mfg. Co., 2448 W. Larpenteur Ave., St. Paul. (FC)

Diebold, Inc., 2011 Mulberry Rd., Canton 2, Ohio. (FC—including microfilm, RM, S, T, V)

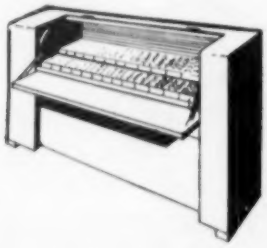
Dolin Metal Products, Inc., 315 Lexington Ave., Brooklyn 16, N. Y. (FC, R, T)

Durable Metal Products Co., 1709 St. Marks Ave., Brooklyn 33, N. Y. (FC)

Elbe File & Binder Co., Inc., 649 Alden St., Fall River, Mass. (V)

Electrofile Corp., 420 Lexington Ave., New York. (RM)

Executive Furniture Co., 2800 Virginia, Wichita Falls, Tex. (FC)



Fandex, Inc., 126 Liberty St., New York 7. (V)

Ferris Business Equipment, 244 Great Meadows Rd., Stratford, Conn. (RM)

Fidelity Steel Equipment Co., Delaware & Morris Sts., Philadelphia 48. (FC)

Filing Equipment Bureau, Inc., 27 Melcher St., Boston 10. (V)

Futuramic Steel Products Corp., 1400 Atlantic Ave., Brooklyn, N. Y. (FC, T)

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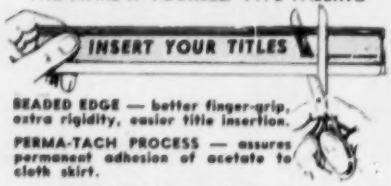

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Herring-Hall-Marvin Safe Co., 1100 Erie Blvd., Hamilton, Ohio. (FC, RM, T)

Hillside Metal Products Co., 262-270 Passaic St., Newark 4, N. J. (FC)

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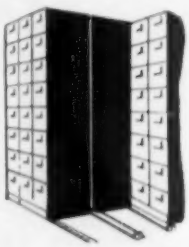

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Kay-Wood Products, Inc., Drawer No. 361, Bedford, Pa. (T)

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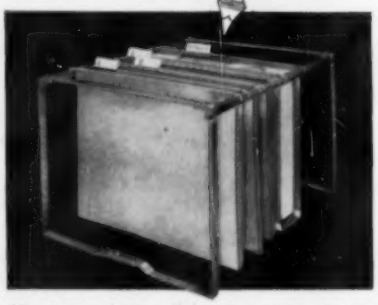

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The Mosler Safe Co., Hamilton, Ohio. (RM)

Motor File, 9028 Sunset Blvd., Los Angeles 46, Calif. (NI)

The National Blank Book Co., P.O. Box 791, Holyoke, Mass. (V)

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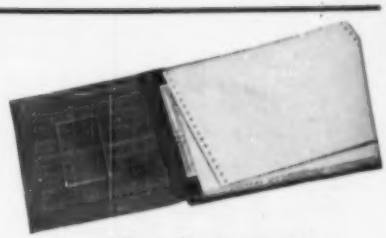

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Duplicating Equipment

JUDGING by the letters received by this magazine, and by the interest shown at recent exhibitions of office machines, no type of equipment holds a greater interest for office executives than those which help them with their copying and duplicating problems. There are those who believe that the Government's demand for reports has had much to do with this interest, but it is also true that systems experts have been finding that duplicating equipment can be made to do many important jobs in the internal operations of a business.

Whatever the cause, it is most certainly an active field. There are now at least thirteen different duplicating processes available, not counting automatic typing or printing from punched cards, tapes, rolls. Each of these processes has its own special qualities. Each varies in some factor such as speed, quality of copies, cost, number of copies which can be made from an original, type of material which can be duplicated, type and color of paper which can be used for final copies, etc.

Because of the differences between processes, no one type is suitable for all kinds of office work. In fact, no two processes, taken together, provide really complete coverage of the needs of a typical company. However, manufacturers have put themselves to a great deal of trouble to find ways of making two or more different processes mutually compatible. As a result of their efforts, a number of formerly independent processes can be used in combination, with greater versatility resulting.

As an example, the familiar stencil, or mimeograph, process formerly required that stencils be cut on a typewriter, or by hand, using a stylus. But today it is possible to prepare stencils by photographic means and by the use of facsimile equipment. This means that photographic methods, which permit the making of exact copies of original material, but which are relatively slow and unsuited for the making of numerous copies, can prepare stencils, for long high-speed runs, of material which formerly could not be transferred to a stencil at all.

Similarly, the xerographic process, which, like photography, can make exact copies, enlarging or reducing as required, is not designed for fast, long runs. But xerography can make masters for use on offset duplicators, and, in a development new this last summer, it can prepare spirit masters.

These advances considerably expand the usefulness of each type of equipment concerned. Nor are these the only successful attempts to pair off familiar processes. Others will be touched upon later in this section.

In spite of the great interest in duplicating methods, there is a great deal of misinformation about them. Many of the copying processes, which include diazo, Thermo-Fax, and xerography, among others, are arbitrarily described as "photocopying"—which they definitely are not.

Users of liquid or spirit duplicators are often heard to speak of preparing a stencil—although a stencil is a sheet with holes punched in it and has nothing whatever to do with the spirit

This permanent active file binder will increase the efficiency of your active files.

"Bound papers read like a book" from front to back.

When the binding flap is folded in, the prongs of the metal fastener are downward so that the latest papers can be added at the bottom; thus maintaining "Bookwise" reading sequence

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OFFICE DUPLICATION METHODS—HOW THEY COMPARE

COPYING PROCESSES Equipment in this category is designed to copy original material, including photographs, art work, drawings, letterheads, etc. It is generally considered best suited to making from one to ten copies, but in some cases (as noted under "Remarks") it can prepare stencils, offset masters, or spirit masters for use with long-run duplicating equipment, thereby greatly extending its usefulness.

Process	Speed*	Estimated Cost Per Copy*	Remarks
Diazo	Letter-size models make about 200 copies per hour. Others take copy up to 54 in. wide at speeds averaging 20-30 ft. a minute.	¾ to 1 cent per letter-size copy	Original must be on material that permits light to pass through it and must be written on one side only. Process cannot enlarge or reduce. Color of printing and paper can be varied from copy to copy. Can prepare offset masters, and can make copies on photocopy papers.
Facsimile	3 minutes per copy	4½ cents per single copy	Can make single copies, stencils, and offset masters. Is essentially a communications device, and can transmit copies long distances. Cannot enlarge or reduce.
Photocopy	1 to 2 copies per minute	8 to 10 cents	Most models make exact-size copies; some can enlarge and reduce. Can make translucent copies for diazo process.
Smokeprinting	60 copies per minute	Fraction of a cent	Can make unlimited number of copies from film or opaque material. Color of ink and copy paper can be varied. Special paper not required. Can enlarge and reduce.
Thermo-Fax	4-15 copies per minute, depending on model	4½ to 5 cents	Makes copies on lightweight paper which can be reinforced with heavier backing. Several paper colors available. Cannot enlarge or reduce. Less sensitive to colored inks.
Verifax	3 copies per minute; single copies, 50 seconds	Single copies, 9 to 10 cents; runs of 3, 3 to 4 cents each	Similar to photocopying, but makes copies on standard office papers. Cannot enlarge or reduce. Copies are black on white. Can prepare offset masters.
Xerography	3 minutes per single copy; multiple copies faster	9 cents per single copy	Can make offset and spirit masters, positive-working offset plates, and translucent copies for diazo process. Can enlarge and reduce.

DUPLICATING PROCESSES Equipment in this category requires preparation of a master, stencil, plate, or the equivalent, such as setting type. In general, it is designed for long, fast runs. Except where noted, masters can be prepared by typewriter or by hand. In some cases, referred to under "Remarks," masters can be prepared by means of certain of the copying processes listed above, making possible the long-run duplication of photographs, art-work, letterheads, etc. Costs per copy are difficult to estimate because they vary with the length of runs. However, they are in the nature of a fraction of a cent per copy. Automatic typing or printing, as from paper rolls or tape, is not included.

Process	Speed*	Number of Copies for which Best Suited**	Remarks
Azograph and Chemograph	100-120 copies per minute	10-125	Master and other materials clean to handle. Corrections to master can be made with rubber eraser. Copies are blue-black, becoming progressively fainter. Machines can also handle the liquid process interchangeably.
Gelatin *(Hectograph)*	10-75 copies per minute, depending on type of machine	10-100	Up to 8 colors can be printed at once; purple gives best results. Copies become progressively fainter. Gelatin can be re-used. Copy paper can be in variety of colors. Glossy paper used.
Offset *(Multilith, Davidson)*	4,500-6,000 copies per hour	10-several thousand; with metal plates, runs to 25,000 are possible	Masters can be made by diazo, facsimile, photographic, Verifax, and xerographic processes, from other masters, and by typing and hand writing or drawing. Work is of high quality. Various colors of ink and paper available; one ink color run at a time. Equipment requires reasonably experienced operator.
Relief *(Multigraph)*	up to about 5,000 copies per hour	300-100,000	Uses movable type, set by hand. Can use slugs, electrotypes, plates, etc. Finished work is of high quality, closely resembling typing. Machine can also do actual printing. Prints one color at a time on wide variety of papers. Changes in text can be made during run.
Spirit *(Liquid, Fluid, Liquid Hectograph)*	40-130 copies per minute, depending on type of machine	10-350	Several colors can be printed at once; purple gives best results. Various colors of copy paper available. Copies become progressively fainter. Glossy paper used.
Stencil *(Mimeograph)*	40-200 copies per minute, depending on type of machine	10-5,000	Stencil can be prepared by facsimile or photographic methods, in addition to typing and hand writing or drawing. Variety of colors possible for both ink and paper. Usually prints one color at a time; multicolor copies possible in some cases.

**Based largely on manufacturers' estimates, with reference to standard machines turning out letter-size copies. Cost figures do not include labor, training of personnel, overhead, or similar costs.*

***Based on cost, speed, and other factors. Shorter or longer runs may be feasible in varying circumstances.*

Figures are approximate and can vary with circumstances.

process. Some confusion also results from a rather free use of certain terms. Thus, the phrase "dry process" has been used to describe various diazo, photocopying, and other methods. The expression is therefore avoided in the present discussion.

Nevertheless, the public is constantly showing greater awareness of the differences between the different duplicating methods. In an attempt to make some of these differences clearer, each of the thirteen processes will be described briefly in the next few pages. The principal points are summarized in the chart on page 104.

The thirteen processes have been divided into two groups: copying processes and duplicating processes (using the word in a truer sense).

In the former category are processes which make copies directly from original material, without the need of making a specially prepared original master, stencil, or the like. They can usually copy art work, letterheads, photographs, drawings, and similar material. In general, they operate relatively slowly, rarely making more than two or three copies per minute. Some are faster, but in other cases, several minutes may be required.

Duplicating processes, on the other hand, are designed to make multiple copies at relatively high rates of speed. They customarily require the preparation of a stencil, plate, or master of some sort, and the copies are made from this master instead of directly from the original material. These processes can, in some cases, make hundreds of thousands of copies, often at speeds of several thousand an hour.

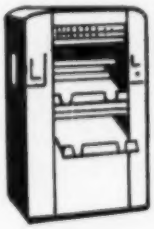
In considering the new developments for making one process compatible with another, it is most significant that in most such cases a copying process has been adapted for use with a duplicating process. The copying method is used to prepare the stencil, master, or plate, for the duplicating method, while the duplicating process is used for long, high-speed runs. Thus the versatility of each process is greatly expanded.

Copying Processes

The Diazo Process

This is a chemical method which takes advantage of two facts: first, that certain chemicals, if allowed to combine, will form a dye, and, second, that they can be prevented from combining by exposing them to light. There are several mechanical methods of accomplishing this, which will be described in the March issue of this magazine, but basically copies are made by passing light *through* the original material so that it strikes a sheet of paper sensitized with chemicals used in the process.

Wherever light strikes the paper, the chemicals are inactivated. However, the chemicals remain active in the areas beneath the lines on the original, and when treated chemically in the machine, they react to form a dye, thus reproducing the original material.



Because the light must pass through the original, the process is not suited to copying pages with material on both sides. Moreover, the original paper must allow light to pass through it. Most stationery, however, in spite of an opaque appearance, is actually sufficiently translucent for use in this process. If the original cannot be copied directly, a translucent copy must first be made. In some cases, this can be made directly on the diazo machine; it can also be made by photocopying or xerography.

The diazo process is quite inexpensive for a copying method, running to about two cents a square foot, or between three-quarters and one cent for a letter-size copy. It is also relatively fast. It operates at speeds up to about 20 to 30 linear feet of copy per minute, with the copy width limited only by the width of the machine throat, which may be as much as 54 in. It is thus often used for copying engineering drawings, as well as for correspondence.

The diazo method can also be used to prepare offset masters, and as a result of a new development, it can also make copies on photocopy papers, using a special filter.

The Facsimile Process

The facsimile process makes use of a photoelectric cell. Material to be copied is placed on a rotating cylinder. A narrow light beam passes over the paper in accordance with a regular pattern and is reflected into the photoelectric cell, where it is used to generate an electric current. The current is transmitted by wire to a copying unit. Here the copy paper is placed on another rotating cylinder. As the light beam in the first machine moves over the original material, a stylus moves over the copy, in synchronization with the light beam. The stylus receives electrical impulses originated by the photoelectrical cell, and the current passing through it "burns" a dark spot on the copy paper. The darkness is proportionate to the strength of the electrical signal. Consequently, this method reproduces the original material, in shades of grey ranging from white to black. It can thus copy photographs.

A facsimile unit may make a copy at any theoretical distance from the original, since electrical transmission by wire intervenes between the original and the copy. The principle, in fact, is used regularly to transmit telegrams between a main telegraph office and a subscriber's desk, and it is conceived basically as a communication method. However, its ability to make exact copies has brought it into the field of office duplication, and some models are designed specifically for that purpose.

Of particular interest is that original material can be copied by this method (using a cutting stylus) onto a stencil for use in a standard stencil duplicator. Offset masters can also be prepared. This permits the duplication of screened photographs, or of art work, line drawings, etc.

The process requires about three minutes to copy a letter; masters and stencils require about six minutes. Single copies cost about four and one-half cents.

The Photocopy Process

This is an adaptation of standard photography in which copies are made on sensitized paper, rather than on film. While office photocopying is done in some instances with an enlarging or reducing camera, the typical office photocopier does not use a camera, and the original material is

placed in direct contact with sensitized paper, no lens system being used.

The original and the sensitized paper are placed face to face and inserted in a printer, where light is passed through the back of the sensitized paper, reflecting off the light portions of the original material and back onto the sensitized paper. Where light strikes it, the paper turns dark. Withdrawn from the printer, the sensitized paper is placed face to face

with another sheet and inserted into a processing unit, where it passes through a developing solution. The image from the first is thereby transferred to the final sheet of paper, producing a right-reading positive copy.

The printing and processing units are often combined in a single machine, but they may be separate. If it is designed to make copies from bound books, the printer used must be of the "flat-bed" type; usually, flat-bed printers are separate units, but not necessarily.

Since light passes through the copy paper, rather than through the original, opaque and two-sided originals may be copied. However, some equipment, using the "direct" rather than the "reflex" method here described, makes the original exposure by passing light through the original.

In one type of equipment, the second sheet is eliminated, the first sheet being processed to make the final copy.

In addition, some camera systems are available, equipped with conveyor systems to move the print through the various stages of the process automatically. Such equipment is bulkier and more expensive, but it is more versatile.

The various photocopying methods will be described in greater detail in the March issue. Photocopy papers now can also be developed in diazo-process models by the use of a special filter.

Using a standard desk-top office photocopier, letter-size copies can be made in from 30 to 60 seconds each at a cost of from eight to ten cents.

Related to photocopying, but differing in some details, is the Verifax process, which is described subsequently.

The Smokeprinting Process

"Smokeprinting" is a kind of nickname popularly applied to an electronic duplicating process developed by The Standard Register Co. (The company officially refers to its product as an "Electronic Reproducer.")

This is a process in which light is used to cancel electrical charges. The material being copied is placed in a special camera-type unit. The image is thrown onto a glass plate which has been coated on its reverse side. The coated side of the plate carries an electrostatic charge, which is intensified by the light falling on it. As a result, a "copy" of the original material has been formed, electrically, on the plate. Copy paper, meanwhile, is placed next to the plate, and, with the "image" thus formed on the glass, an electrically charged ink is sprayed into the vicinity of the plate. Because f electrical attraction, the ink is drawn to the charged areas on the plate, but the paper intercepts the ink particles, and the image is thus printed on the paper.

This process has been developed to a point at which it can make one copy per second. At this rate it is really in a category midway between copying and duplicating processes, but, because of the fact that the original material is itself used to make the copies, it is classed here as a copying process. At its present stage of development, the process can make letter-size copies for a fraction of a cent each.

The Thermo-Fax Process

Thermo-Fax is a heat process. It makes use of the fact that dark substances absorb more heat than do light substances. The heat absorbed by written or printed lines on a sheet of paper is used to "burn" an image into a chemically treated copy paper.

This is one of the fastest of the copying processes, requiring about four seconds a copy in the newest models. The original and the copy paper are placed in the machine (in the new models they are inserted through a slot, as in a standard photocopier) and infra-red light is passed through the copy paper. Where it strikes dark lines on the original, enough heat is absorbed to turn the copy paper dark.

The process is most effective with carbon-base inks, and is less responsive to colored material or to ordinary fountain pen ink. It can copy material from opaque and two-sided originals because the light used is reflected back from the original material and does not pass through it. The per-copy price is about four and one-half to five cents. Copy paper of various colors is available. Since the paper is light in weight, a heavy back-up paper is available, which, if it is used, adds strength to the copy and is welded to it so firmly as to constitute, for all practical purposes, a part of it.

The Verifax Process

Although derived from photographic principles, the Verifax process is a distinct method, with its own special characteristics. Its most distinctive characteristic is that it can be used to make copies on ordinary office stationery, special paper not being required.

As in photocopying, the original is placed face to face with a specially treated paper, in this case called a matrix. Both are exposed in the machine, with a light beam being projected through the matrix. This light is reflected from the light areas of the original (but not from the dark lines) to the matrix, where it produces certain chemical reactions. The matrix is passed through an "activator" solution, as a result of which the portions of the matrix not reached by the light (i.e., the portions corresponding to the writing on the original) are developed in the form of a dark dye-like substance.

This substance can be transferred to ordinary stationery, whereas the white portions have been "fixed," and cannot be so transferred.

This transfer is brought about by placing the matrix face to face with the copy paper and passing both through a pair of rollers. By means of this physical contact, the top layer of the dye is transferred to the copy paper, producing a copy of the original material.

Since a portion of the dye remains on the matrix, additional copies can be obtained until the dye is exhausted. The process is designed to make three copies from a matrix, but by lightening the first copies, it is possible to obtain six or more copies.

The time required to make the first copy is about 50 seconds, but three copies can be made in about one minute. Single letter-size copies cost nine to ten cents, but in runs of three,

what cost corrections like this?

In the eyes of the receiver, a bulletin represents the sender—represents his standards. How do you think the sender of the above bulletin is represented?

There is now no need—no excuse for duplicated representatives to hint of carelessness.

With the advances in MODERN duplicating you can have copies with corrections that defy detection—clean, clear copies of written, typed and drawn material, produced at high speed, in one or more colors, on a variety of paper and card stocks in a range of sizes. And produced at low cost.

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Stenafax

the ELECTRONIC copying machine

for mimeograph stencils, offset plates, single positive dry copies

Just push a button—and the operator can go on to other work. Stenafax shuts itself off. It copies office forms, news clippings, typing or any graphic material. It is a complete copying unit, requires no chemicals or developing, no special powders, light box or heat treatment.

It makes stencil or offset plates in 6 minutes or less . . . or a single dry positive copy in 3 minutes or less—on a working area of 8½" x 14". Easy to maintain, movable—can be plugged into ordinary outlet for on-the-spot copying at important meetings.

Stenafax saves costly errors, retyping . . . eliminates proof reading. Stencils are durable, can be stored, folded, used again and again.

Mail this coupon today for full information on how Stenafax can save your firm time and money.

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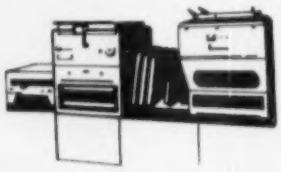
the per-copy cost is from three to four cents.

A development new in 1955 makes it possible to prepare offset masters by this method. Thus photographic material, art work, and the like can be prepared for offset duplication by the Verifax method.

The Xerographic Process

Xerography is an electrical process which employs the principle that positive and negative electrical charges attract each other. A special camera is used, which projects an image of the original material on a special plate which has been given a positive electrical charge.

Light falling on the plate cancels this charge, leaving the "image" of the original dark lines in the form of a positive electrical charge. This plate is then placed in a developing tray, and a dark, negatively charged powder is passed over it. The powder adheres to the plate wherever it is charged, creating a new image of the original material in powder.



A piece of positively charged copy paper is placed over this plate. Here it picks up the negatively charged powder. By placing the paper in a "fuser," where heat is applied, the powder is fused, creating a permanent copy.

In addition, offset masters and positive-working offset plates can be prepared by xerography, so that photographic and other material can be prepared easily for reproduction by that method. During the last year, xerography has also been adapted to the preparation of spirit masters; thus, it is now possible to reproduce photographs and art work quickly by that method also. Translucent masters for diazo-process reproduction can also be made by xerography.

While it may require about three minutes to prepare a single copy, a new development permits the taking of as many as eight copies, including an offset master, from one plate, thus considerably reducing the average time for each copy.

The process permits reduction and enlargement of the original material. Originals may be on opaque paper and may be two-sided.

The cost of single copies is estimated at about nine cents. Copies made by spirit or offset methods from xerographically prepared masters, of course, cost a fraction of a cent each on long runs.

Duplicating Processes

The Azograph and Chemograph Processes

These two methods may be considered as variations of the same basic chemical process. They differ somewhat in the mechanical methods employed, but are sufficiently alike to be grouped in this survey as one process.

Superficially, they resemble the familiar spirit process, and, in fact, it is possible to perform spirit process duplication on an Azograph or Chemograph machine. Chemically, however, they are quite different.

A master is prepared in any of several ways. A sheet of a special, coated paper is used for the master. A transfer sheet, somewhat like the "carbon" used in spirit duplicating, except that the coated side is light brown in color and is chemically different, is placed with the coated side against the back of the master.

The two sheets may then be inserted in a typewriter, or written on manually. Wherever pressure is exerted by the type or the writing instrument, the master picks up a portion of the brownish coating from the transfer sheet.

The master is then wrapped around the cylinder of the duplicating machine. As it rotates, copy paper is fed into the machine, and as it enters, it is moistened with a colorless liquid. This liquid contains a chemical agent which reacts with the deposits on the reverse of the master to form a blue dye. As the dye is formed a thin layer of it remains on the copy paper, creating the desired copy.

Although a portion of the deposits on the master is removed to make each copy, enough is available on one master to make from 50 to 125 copies. The duplicating speed is about 100 copies a minute.

The special virtue of this process is its cleanliness. Unlike the spirit pro-

in the time it takes to get ready to type...

. . . *DRI*-STAT makes a perfect copy!

The Peerless Dri-Stat Photocopy System gives you an exact black and white copy in less than a minute. This compares to many minutes of typing time, often hours of laborious tracing. And the cost is less than 9¢ per copy.

Dri-Stat copies more things better than any other photocopyer. Letters, charts, drawings, clippings, halftones, colored inks, pencilled notations . . . even pages from thick, bound volumes . . . are reproduced with photographic accuracy.

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cess, it does not expose the dye to direct touch, for the dye is not formed until the master and the paper have both been placed in the machine.

Machines for use with this process can be used for spirit duplicating, but spirit duplicators, unless specially adapted, are not suited for Azograph or Chemograph duplication.

Copies cost about the same as a similar number of spirit process copies—a fraction of a cent each.

The Gelatin Process

This method is sometimes known as the "hectograph" process. It is chemically similiar to the spirit process, which is sometimes referred to as the "liquid hectograph" process.

As in the spirit process, a master is prepared, but normally a special hectograph ribbon is used, if the master is prepared on a typewriter. Alternatively, the master may be created by writing on it with a special hectograph ink, pencil, or crayon, or it can be produced by writing or typing through a special carbon paper.

Unlike the spirit process, the gelatin method requires the writing to be on the face, rather than the back of the master. The master then is placed face down on a gelatin surface, which usually is cloth-backed. When pressure is applied, the dye deposits on the master are transferred to the gelatin.

To make copies, the copy paper is next brought into direct contact with the gelatin. Each copy sheet picks up a small portion of the dye. There is usually enough dye on the gelatin to make at least 50 good copies. The copies become successively fainter, but it is sometimes possible to obtain as many as 100 or more usable copies.

Gelatin machines may be of one of two types. In the "flat-bed"type, the gelatin is stretched across the machine bed, while in the "rotary" type, it is fastened around a rotating cylinder.

Flat-bed duplicators, which require each copy sheet to be laid across the gelatin, can make about a dozen copies a minute. Rotary machines operate at speeds of about 50 a minute.

Copies cost but a fraction of a cent each. Copies are usually purple, but other colors are available, and any combination of them may be printed at once.

The Offset Process

This process is derived from the printing process known as photo-offset lithography, which has been simplified for use in the office.

Again a master is used. It is usually prepared by writing, typing, or drawing on the face of a special sheet with some form of greasy ink. Typewriter ribbons of the proper variety can be used. The master is then placed on the rotating drum of the duplicator.

Here it passes into contact with two rollers in succession. The first roller is moistened with water. The water from it sticks to the master, except where lines have been drawn or typed on it, for these lines are greasy and repel the water.

The master, which now contains the image as a set of greasy lines on a wet background, then passes under the second roller, which moistens it with a greasy ink. Again, oil and water refuse to mix, and the ink is washed off the wet portions of the master, remaining on the greasy lines.

Theoretically, it would now be possible to bring the master into contact with the copy paper and to print directly on it. For technical reasons, however, the master comes into contact with a cylinder covered with a rubber "blanket," and the image is "printed" on this cylinder.

As the blanket cylinder rotates it is brought into contact with another roller by which the copy paper is fed into contact with it. The final copies are then made by printing from the blanket cylinder.

This "offsetting" of the ink image by means of the blanket cylinder is what gives the process its name. The texture of the blanket is such that it can press the ink firmly into the copy paper. Thus it is possible to print on fairly rough paper if need be, and even to print halftones successfully on such paper.

The offset process can produce work of high quality, and since masters can be prepared by several of the copying processes, including diazo, facsimile, Verifax (by means of a special attachment), and xerography, it can reproduce photographs, art work, etc. Offset masters and plates are also prepared by photographic methods.

Offset masters can produce several thousand copies, and masters can be made from masters. Using metal plates, runs of 25,000 copies are possible. Naturally, costs vary with the length of the run. On runs of a thousand, the cost per copy is estimated at between one-fifth and one-quarter of one cent. The equipment requires more skill to operate than some other types, but new advances have simplified operation importantly.

The Relief Process

The term "relief" refers to any kind of printing from raised type, which may include plates, and wood or rubber blocks, as well as metal type. The type may print through an inked ribbon, as in the case of an ordinary typewriter, or it can be inked and used to print directly.

The relief method has been used for office duplicating for many years. It was long known as the "multigraph" method, after a trade name owned by the Addressograph-Multigraph Co. Since the company now uses that term as a general name for its duplicating equipment, it distinguishes between its relief-process duplicators by referring to them as "Multigraph (Relief Process)" equipment, and to its offset duplicators by the phrase, "Multigraph (Multilith Process)."

The typical relief-type duplicator for office work uses movable type, which is set by hand. In most models the type is set in channels on a rotating drum. A wide inked ribbon is placed over the drum, and as the drum rotates it is brought into contact with the copy paper. The impression is made by printing through the ribbon.

The result is a copy which looks very much as if it had been typed individually. Thus, the process is ideal for "fill-in" letters, provided the run is long enough to justify the labor of setting the type. Since this type setting is manual, it takes time, and the relief process is therefore best used for long runs. It can readily produce

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runs of 100,000 copies, however, at speeds up to 5,000 an hour. Once the type is set (and this costs only the labor involved), the cost per copy is very small. One manufacturer's estimate is relevant: two dollars a thousand copies for paper, three cents for actual duplicating costs for that number.

The quality of the copies is superior, and one particular advantage of the method is that changes can be made during the run—such as changes in a price list.

It is possible to use relief duplicators also for direct printing from the type. The ribbon is not used, and the type is inked by a roller or other means. This method produces work of the quality of standard printing.

The Spirit Process

This method and the stencil method are the most familiar duplicating processes used in the office. The spirit method, also known as the liquid or fluid, process, and sometimes as the liquid hectograph method, is chemically very much like the gelatin method described above. It uses aniline dyes.

A master, of special coated paper, is used. (Spirit masters are often called stencils, but this is not a correct usage.) To prepare the master, a specially coated "carbon" is placed face up beneath it. The master is then written, drawn, or typed upon, and where pressure is applied, the master collects deposits of dye from the carbon underneath. These deposits, of course, are on the back of the master, and they make up a mirror image of the material originally written. While this is the familiar method, spirit masters can now also be made by xerography.

The master is placed around the drum of the duplicator. As it rotates, a sheet of high-finish copy paper is fed simultaneously into the machine. As it enters, it is moistened with a solution containing alcohol (thus, the name "spirit" duplication). The alcohol serves as a solvent for the dye. By moistening it, the top layer of the dye is easily transferred to the copy paper. Enough dye is deposited originally on the master to make several hundred copies.

The darkness of the copies can be varied by adjusting the flow of liquid and the speed of rotation. If copies of medium darkness are acceptable, it is possible to make 300 or 400 satisfactory copies, and sometimes 500 or 600. However, the copies grow progressively fainter, and in practice the spirit process will normally produce 200 to 300 good copies.

Machines are available for both manual and electric operation. Hand-powered models can usually make about 40 to 60 copies a minute; electric machines operate most efficiently, as a rule, at about twice that speed.

Most copies are of a purple color, since purple dye is capable of making longer runs than other colors. However, a number of colors are available, and any or all of them can be printed at the same time.

The per-copy cost, on typical runs, is estimated at between one-quarter and one-half of one cent.

The Stencil Process

Known popularly as the "mimeograph" process, after the trade name of the A. B. Dick Co., which pioneered in stencil-type duplication, the stencil process is probably the most familiar of all office duplicating processes.

The method employs a stencil, which is a special sheet into which the material to be duplicated is cut in the form of a series of openings, or holes, through which ink can be forced. To prevent the centers of such letters as "o" and "D" from falling out, the standard stencil consists of a porous sheet which has been coated with a wax which is impervious to ink.

By the pressure of a typewriter key, or of a writing instrument, the wax is simply pushed aside to create the necessary openings for the ink. The porous base allows the ink to pass through, and at the same time it holds the inner parts of letters firmly in place. Stencils can also be prepared by the facsimile process, and in some cases facsimile-type equipment has been designed specifically for this purpose. By this means screened photographs and line work can be transferred to ordinary stencils.

The stencil is wrapped around the drum of the duplicator. An ink supply is provided from inside the drum, which is perforated, and is forced

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through the openings of the stencil. As the drum rotates it comes into contact with the copy paper, which is fed into the machine simultaneously, creating the final copy.

Ink may be supplied by means of a pad, which distributes it evenly inside the cylinder. In another type of machine, the ink is supplied by means of two solid rotating cylinders (the "dual-cylinder" principle) covered with a silk screen, through which the ink passes to the stencil. A paste ink, supplied in tubes, is used with the latter type; this method is designed to be particularly clean to handle.

Stencil duplicators of the manual type can turn out between 40 and 80 copies a minute. Electrically powered models can produce about 200 copies a minute. Costs per copy are estimated from about one cent on runs of 50 copies to between one-fifth and one-third of one cent on runs of 1,000 copies. Used with special ink, a stencil duplicator can make copies on bond or offset papers; ordinarily a special, rough paper is used.

Ordinary good stencils, properly handled, can make several thousand copies. Special stencils, including metallic types which can be prepared photochemically, can produce many thousands of copies.

Equipment has many uses

In addition to their use for standard copying and duplication, certain of these processes are being used in systems work. For example, a master can be prepared containing such information as name and address of a customer, description of materials purchased, and other relevant items. On certain "systems" machines, portions of this material can be duplicated selectively. Thus, from the one master it is possible to create duplicate shipping and production copies, delivery copies, order picking copies, duplicate billing, ledger, and collection copies, and at the same time prepare shipping tags and labels.

Various duplicating processes have also been used in addressing equipment. Among those so adapted are the spirit, stencil and relief methods, and, in at least one case, the facsimile method.

Duplicating equipment is also being used as part of integrated data processing systems. Typewriters can be directed automatically as a by-product of the work of other office machines, and masters or stencils can thus be prepared for certain systems applications, making a variety of accounting and other records automatically.

The Manufacturers

The following list of manufacturers indicates briefly the type of duplication equipment offered by each. This subject will be covered again, with additional information, in the March issue of this magazine.

The types of equipment made by each manufacturer are indicated by the following codes:

AC—Azograph or Chemograph
D—Diazo
F—Facsimile
G—Gelatin (hectograph)
NI—No information available
O—Offset
P—Photocopy
R—Relief
Sm—Smokeprinting
Sp—Spirit (fluid, liquid, liquid hectograph)
St—Stencil (mimeograph)
T—Thermo-Fax
V—Verifax
X—Xerography

Addo Machine Co., Inc., 145 *West 57th St., New York* 19. *(P, St)*

Addressograph-Multigraph Corp., 1200 *Babbitt Rd., Cleveland* 17. *(O, R)*

Air Associates, Inc., Electronic Equipment Div., Teterboro, N. J. (F)

American Photocopy Equipment Co., 1920 *W. Paterson Ave., Chicago* 26. *(P)*

American Tag Co., 151 *Cortland St., Belleville* 9, *N. J. (R)*

Anken Film Co. Inc., Newton, N. J. (P)

Autocopy, Inc., 12150 *S. Peoria St., Chicago* 43. *(G, Sp, St)*

Bohn Duplicator Corp., 444 *Fourth Ave., New York* 16. *(F, St)*

Charles Bruning Co., Inc., 4700 *W. Montrose Ave., Chicago* 41. *(D)*

Chesapeake Industries, Inc., 11 *W. 42nd St., New York* 17. *(NI)*

Columbia Ribbon & Carbon Mfg. Co., Inc., 551 *Herb Hill Rd., Glen Cove, L. I., N. Y. (G)*

Copease Corp., 270 *Park Ave., New York* 17. *(P)*

Copycat Corp., 41 *Union Square W., New York* 3. *(D, P)*

Copy-Craft, Inc., 105 *Chambers St., New York* 7. *(P, Sp)*

Copy-Plus, Inc., 2817 *W. Carmen Ave., Milwaukee* 9. *(Sp)*

Cormac Industries, Inc., 80 *Fifth Ave., New York. (P)*

Curtis-Young Corp., 110 *West 18th St., New York* 11. *(NI)*

The Dansen Co., Box 556—203 *Clinic Bldg., St. Cloud, Minn. (St)*

Davidson Corp., 29 *Ryerson St., Brooklyn* 5, *N. Y. (O, R)*

A. B. Dick Co., 5700 *W. Touhy Ave., Chicago* 31. *(AC, O, Sp, St)*

Ditto, Inc., Chicago 12. *(AC, G, O, Sp)*

Duophoto Corp., 30 *W. 25th St., New York* 10. *(P)*

Duplicating Machines Corp., 110 *W. 17th St., New York (Sp)*

Duplicators, Inc., 200 *E. 72nd St., New York* 21. *(Sp)*

Duplicopy Co., Inc., 224 *W. Illinois St., Chicago* 10. *(Sp)*

Eastman Kodak Co., 343 *State St., Rochester* 4, *N. Y. (V)*

Frankel Mfg. Co., 285 *Rio Grande Blvd., Denver Colo. (NI)*

General Photo Products Co., Inc., General Photo Bldg., Chatham, N. J. (P)

Gestetner Duplicator Corp., 50 *McLean Ave., Yonkers* 5, *N. Y. (P, St)*

Graphic Duplicator Co., 473 *Broadway, New York* 13. *(G)*

The Haloid Co., 256 *Haloid St., Rochester* 3, *N. Y. (P, X)*

Milo Harding Co., 500 *S. Monterey Pass Rd., Monterey Park, Calif. (St)*

Harris-Seybold Co., 4510 *East 71st St., Cleveland* 5. *(O)*

Hart Mfg. Co., 2400 *Endicott St., St. Paul* 14, *Minn. (Sp)*

Hecto Products, Inc., 110 *W. 17th St., New York* 11. *(G)*

Hectographia Corp. See: *Hecto Products, Inc.*

The Heyer Corp., 1850 *S. Kostner Ave., Chicago* 23. *(G, Sp, St)*

Hunter Photo Copyist, Inc., 566 *Spencer St., Syracuse, N. Y. (P)*

International Standard Trading Corp., 22 *Thames St., New York* 6. *(F)*

Keller Duplicator Co., 545 *E. Third St., Long Beach* 12, *Calif. (St)*

A. Kimball Co., 444-48 *Fourth Ave., New York* 16. *(R)*

F. G. Ludwig, Inc., 650 *Coulter St., Old Saybrook, Conn. (P)*

Marr Duplicator Co. Inc., 53 *Park Place, New York* 7. *(St)*

Master Addresser Co., 6500 *W. Lake St., Minneapolis* 16, *Minn. (Sp)*

Microlex Corp., 1 *Graves St., Rochester* 14, *N. Y. (P—from microfilm)*

Mimeo Mfg. Co. Inc., 405 *Broad-*

way, New York 13. (St)

Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul 6, Minn. (T)

The Multistamp Co., 527 West 21st St., Norfolk 1, Va. (St)

Niagara Duplicator Co., P.O. Box 1175, Concord, Calif. (St)

Old Town Corp., 345 Madison Ave., New York. (Sp)

Ozalid, Div. of General Aniline & Film Corp., 13 Ansco Rd., Johnson City, N. Y. (D)

Paragon-Revolute Corp., 117 South Ave., Rochester 4, N. Y. (D)

The C. F. Pease Co., 2601 W. Irving Park Rd., Chicago 18. (D)

Peck & Harvey, 5650 N. Western Ave., Chicago 45. (D)

Peerless Photo Products, Inc., Shoreham, Long Island, N. Y. (P)

Pekas Duplicator Co., Lock Box 33, Lesterville, S. D. (St)

Photostat Corp., 303 State St., Providence 4, R. I. (P, V)

Polychrome Corp., 2 Ashburton Ave., Yonkers 2, N. Y. (Special unit for making offset masters by Verifax process)

Post-O-Graf Mfg., Co., Trucksville, Pa. (St)

The Print-O-Matic Co., Inc., 724 W. Washington Blvd., Chicago. (St)

Queen Ribbon & Carbon Co., 101-02 37th Ave., Garden City, N. Y. (NI)

Recordak Corp., 444 Madison Ave., New York 22. (V)

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. (P)

Rex-O-Graph, Inc., 7840 W. Hicks St., Milwaukee 14. (Sp)

Rex-Rotary Distributing Corp., 19 W. 31st St., New York 1. (St)

Robertson Photo-mechanix, Inc., 7440 Lawrence Ave., Chicago. (P)

Rutherford Duplicator Co., P.O. Box 13087, Houston 19, Texas. (St)

Simplimat Corp., 633 S. Plymouth St., Chicago 5. (NI)

Smith-Corona, Inc., 701 E. Washington St., Syracuse 1, N. Y. (G, Sp)

Speedliner Co., 4404 Ravenswood Ave., Chicago 40. (Sp)

The Speed-O-Matic Co., 7640 W. Norton, Hollywood, Calif. (St)

peed-O-Print Corp., 1801 W. Larchmont Ave., Chicago 13. (St)

Standard Duplicating Machines Corp., 1935 Revere Beach Blvd., Everett 49, Mass. (Sp)

The Standard Register Co., Campbell & Albany Sts., Dayton 1, Ohio. (Sm)

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Stenafax, The Biltmore Arcade, Madison Ave., at 43rd St., New York 17. (F)

Technygraph Co., Techny, Ill. (St)

Tecnifax Corp., Holyoke, Mass. (NI)

U. S. Copyline, Inc., 580 Fifth Ave., New York 36. (D, P)

Vari-Color Duplicator Co., 500 S. Lincoln St., Shawnee, Okla. (Sp, St)

The Western Union Telegraph Co., 60 Hudson St., New York 13. (F)

Windsor-Embassy Chemical Corp., Milford, N. H. (NI)

Wolber Duplicator & Supply Co., 1201 Cortland St., Chicago 14. (Sp)

Typewriters

THERE may be offices without bookkeeping machines, dictating equipment, or even duplicators, but an office without a typewriter is almost inconceivable. The typewriter, without doubt, is the champion workhorse among office machines.

It was originally conceived, of course, as a writing machine, capable of producing neat and orderly copy. As operating skills developed, it became obvious that it could produce written material faster than could handwriting, and when carbon paper came into wide use, it showed new capacities for producing multiple copies.

The basic machine has undergone relatively few changes of significance. Over the years, little refinements have been added from time to time, and its appearance has, of course, become more streamlined.

There have been changes in the arrangements of keys and in the slope of the keyboard. New keys have been added—many contemporary designs include "plus" and "equals" signs or exclamation points, and special keyboards have been developed in abundance through the years. Devices to simplify margin setting and tabulation have appeared from time to time. Half-spacing, both vertical and horizontal, has been introduced. Other advances have made the internal mechanisms more accessible for servicing. But, in general, these changes have not been spectacular, and the typewriter has grown to be the efficient machine it is today by a process of gradual and sensible evolution.

From the standpoint of the operator, perhaps the biggest change was the development, a number of years back, of the electric typewriter, for this brought with it the need for new typing techniques.

The slope of a manual keyboard is designed to permit the typist's fingers to approach the keys with maximum power—with the fingers bent. Finger strength, after all, is the sole source of power used to depress the keys. Especially if a number of carbon copies are to be made, the keyboard must permit the operator to use her finger muscles efficiently.

But the electrified keyboard eliminated the need for a strong touch. The keys were driven electrically and merely needed to be touched lightly. The sharp slope of a manual keyboard is not the most efficient design when finger strength is not required. Accordingly, the keyboard slope of an electrical typewriter is considerably flatter. In fact, when electric machines were first introduced, the slope was flatter than is found in most of today's electric models.

This flatness proved to be an operating hazard, not because it was inefficient, but because typists had been trained on manual keyboards and had trouble adjusting to it. Thumbs caught on bottom rows, pressing keys that were not meant to be touched. Fingers lingered too long on the sensitive keys, and letters repeated themselves unintentionally. In short, the new machine was difficult to get used to.

As a compromise, to invite typists to make a real effort to accommodate themselves to electric models, the manufacturers restored at least part of the original keyboard slope. It is easier than it used to be to readjust one's typing technique. Presumably, if all typists were to learn their skill originally on electric models, the flatter keyboard would return, because of its greater potential efficiency.

Judging by a sample of reader opinion taken by this magazine during the fall, the electric typewriter is definitely growing in popularity, although it is still considerably outnumbered by manual machines. It is considered especially valuable for cutting stencils and for preparing material with multiple carbon copies, where its power saves operator fatigue.

The typewriter, however, has become more than a mere writing instrument. It can be used to control other business machines. Specifically, it has been adapted to punch holes in paper tape in codes of various capacities, including the five-channel code used to actuate teletypewriting equipment. It can do this at the same time as it prepares a normal typed document. Material typed on a tape-punching machine can thus be sent by wire over long distances. A similar tape, if needed, can be punched automatically at the receiving unit.

Significantly, such a tape can be fed into other types of office machines, including automatic graphotypes, where it is used to prepare address plates, and computing equipment, where it can be made to perform a variety of bookkeeping and accounting operations. In other words, the typewriter can be used as a basic machine in an integrated data processing system using punched paper tape as a means of communication between machines. It can produce the tape which causes other types of office equipment to do their work without further human intervention. It is, in short, a primary agent of the so-called automatic office.

Less glamorous, perhaps, but extremely useful, are typewriters of the composing variety. Such machines, which often are designed so that they can print in different styles of type interchangeably, can be used to prepare material for duplication by offset and other methods. They provide the means of evening out—"justifying"—both margins of the typed material so that the work resembles a professional printing job. A composing typewriter, in combination with the appropriate duplicating equipment, can therefore be used to turn out small magazines, newspapers, direct mail pieces, and the like.

In addition, the typewriter has been subjected to modifications which adapt it for systems work of various types. Some new equipment, for example is equipped with front feed carriages, ten-key keysets, and other features, which make it suitable for work in such operations as payroll, accounts receivable, and accounts payable.

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It is possible to use one typewriter to control other typewriters automatically. The "slave" typewriters can be set to type information selected from that prepared on the first, or "master", machine. Thus differing documents relating to the same matter can be prepared simultaneously in original form. For instance, as a statement is typed, the name and address might be typed at the same time on an envelope and on a shipping label; details of the order would not appear on the envelope, and only selected details on the label. While this is an entirely theoretical application, the principle should be clear.

More simply, the master-slave relationship between typewriters can be used to prepare duplicate originals of the same material simultaneously.

Automatic control of typing has long been familiar as a technique for the preparation of form letters. An original copy is punched on a roll resembling a player piano roll. As this roll passes through the machine, it causes the typewriter keys to operate in correct sequence, shifting, spacing, and indenting as required. The roll can be directed to stop automatically so a typist may insert variable information, such as dates, amounts, and names, manually. Speeds to 135 words a minute are possible, with unfailing accuracy.

Such equipment produces copy that looks as if it had been individually typed, and it can prepare carbon copies. Actually, of course, a standard typewriter is used, the controlling mechanism being a separate unit connected with it.

Two or more such machines may be used to make an efficient combination. The typist begins by typing date, name, address, and salutation on the first machine and then starting the automatic mechanism. While the machine is typing the body of the letter, she follows the same procedure on a second machine, starting it off and then returning to the first to make any necessary fill-ins, and to remove the paper when the letter is completed. One typist can thus operate two, or sometimes more, machines simultaneously, turning from one to the next as her attention is needed for manual operations.

Some equipment of this type uses rolls containing a number of different paragraphs, which may be combined in numerous ways to form letters. The operator selects the desired paragraphs by perforating a control tape or by pressing a series of buttons, and the machine automatically types the paragraphs selected. Some equipment uses two rolls to direct the same type-

writer, successive paragraphs being selected from the two rolls alternately. While the machine is typing from one roll, the other roll is being advanced automatically to the next, thus eliminating "dead time" while the machine skips over unwanted material.

Still other modifications have been made to the basic typewriter. In some cases, machines can be operated by electrical inputs, making it possible to print out the results of computation generated by a computer system.

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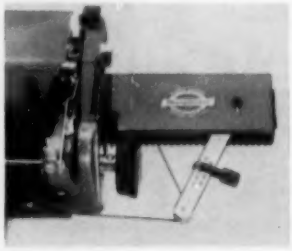

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In other cases, the machines can automatically record data from instruments measuring speeds, temperatures, pressures, or other values. In still another case, an experimental model has been developed in which complete words and phrases, up to 18 characters in length each, can be stored in a "memory" unit; pressing a button causes the machine to type these words or phrases automatically at speeds of 150 words a minute or more; if frequently recurring expressions are recorded in the machine, the device can thereby provide a number of short cuts in routine typing.

The vast majority of typewriters, of course, are used for conventional typing, statistical tabulations, and other conventional business operations. But it is interesting to see the new uses to which typewriters are being put.

While no startling developments in the basic machine appear likely, interest has recently been aroused in tests to be conducted by the U. S. General Service Administration to determine the feasibility of using the Dvorak simplified keyboard, which, it is claimed, can materially increase typing efficiency.

This keyboard, which first received attention in 1940, is designed to group the keys so that the maximum use can be made of the strongest fingers without their having to leave the guide row of keys. This design also takes account of the fact that most people have stronger right hands than left hands, and the keys are arranged to permit an appropriate division of the work load.

It is claimed that the Dvorak keyboard allows the typing of 30 times as many words entirely on the guide row as does the conventional keyboard, and that very few words remain for typing exclusively by one hand (61 such words as compared to 3,900 in the standard keyboard, of which 3,500 are left-hand words).

The National Office Management Association, reporting on tests made by the Navy in 1943 and 1944, said that those studies showed a 74 per cent gain in net words per minute for typists trained on the Dvorak keyboard. However, the gain was 43 per cent for typists who had learned originally on standard keyboards and had to be retrained. It was pointed out that since these gains applied only to actual typing time, the overall gain usually amounted to about 25 to

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35 per cent of the typist's working time.

The present series of tests will no doubt add new information on the subject. So far there has been a definite tendency to resist major keyboard changes because of the problem of retraining typists. The equipment changes involved appear to be of minor importance, for they can be made easily and without major expense.

It has also been pointed out that the Dvorak keyboard does not repsent the only attempts at simplification. The Algee-Barnett design is one of several, and others have been brought forth by Roy Griffith and Dr. Roy Hoke, among others.

It is therefore conceivable, though by no means immediately probable, that an improved keyboard will supersede the present one, which is admittedly clumsy. While such a move would undoubtedly encounter strenuous resistance, it does appear that the business world, which has been jarred somewhat by the advances in office automation, may be at least a little more receptive to experimentation than it has been in the past.

The Manufacturers

Following is a list of the major manufacturers of office typewriters, including special types. An indication of the categories offered is included.

The codes used in the list are as follows:

A—Equipment for controlling typewriters automatically.

C—Composing and justifying typewriters

E—Electric typewriters

IDP—Typerwriters for use in integrated data processing systems, i.e., using a "common language" medium such as punched tape, punched cards, magnetic tape, etc.

M—Miscellaneous

N—Noiseless typewriters

NI—No information available on current products

P—Portable typewriters

S—Standard typewriters (manual)

The Adamm Co., 656 Broadway, New York 12. (C)

Addo Machine Co., Inc., 145 W. 57th St., New York 19. (C, E, P, S)

R. C. Allen Business Machines, Inc., 678 Front Ave., N.W., Grand Rapids 4, Mich. (E, S)

Alma Office Machine Corp., 440 Fourth Ave., New York 10. (P, S)

American Automatic Typewriter Co., 2323 N. Pulaski Rd., Chicago 39. (A)

Commercial Controls Corp., 1 Leighton Ave., Rochester 2, N. Y. (A, C, E, IDP)

Ralph C. Coxhead Corp., 720 Frelinghuysen Ave., Newark 5, N. J. (C, M—machines for stencil cutting, machines in unusual foreign languages)

Facit, Inc., 404 Fourth Ave., New York 16. (P, S)

Industrial Molded Products Co., Inc., 609 New York Bldg., St. Paul 1. (NI)

Inter-continental Trading Corp., 90 West St., New York 6. (P, S)

International Business Machines Corp., 590 Madison Ave., New York 22. (C, E, IDP)

Metropolitan Typewriter Co., 18097 Sorrento Ave., Detroit 35. (P, S)

Olivetti Corp. of America, 580 Fifth Ave., New York 36. (E, P, S)

Paillard Products, Hermes Div., 100 Sixth Ave., New York 13. (P, S—including machines with electric carriage return)

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. (E, IDP, N, P, S)

Robotyper Corp., 125 Allen St., Hendersonville, N. C. (A)

Royal Typewriter Co., 2 Park Ave., New York 16, N. Y. (E, M—systems machines with front feed, P, S)

Smith-Corona Inc., 701 E. Washington St., Syracuse 1, N. Y. (E, P, S)

Underwood Corp., 1 Park Ave., New York 16. (E, IDP, M—machines for printing istrument readings automatically, P, S)

Dictating Equipment

SHOULD business letters have to be written two times each? If this seems like an odd question, consider that, as a matter of standard practice, most business letters actually *are* written twice, not counting first drafts and revisions. They are written first in a shorthand book, and again on a typewriter.

The question is, is it necessary? Well, that depends on the situation. If the question is, is it physically possible to eliminate one of the writings, the answer is, of course, yes. The latter can be recorded on a dictating machine, without the assistance of the secretary. It need actually be written only once—when it is transcribed.

But necessity encompasses many things. If a busy executive is in the habit of delegating certain details of his work to his secretary, as many do, he may need her help in preparing letters on subjects with which she has been working more closely than he. Or he may need the help of her memory in recalling minor details of policy or practice which he has not recently reviewed.

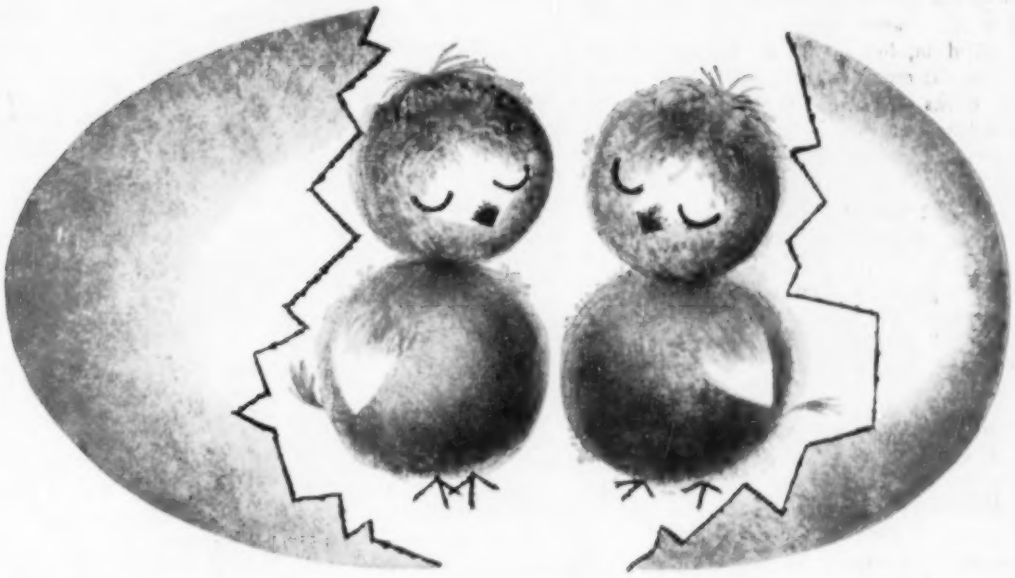
In other words, if the secretary is more than a mere machine for taking dictation and putting it into written form, she may be able to contribute enough to the actual dictation to justify her being on hand to take it down once before she types it.

On the other hand, there are many letters to which the secretary can make no contributions of any importance, so that, from that standpoint at least, it is a duplication of effort to ask her to write the letter both in shorthand and on the typewriter.

There is really no question, then, that dictation to a stenographer really involves a double effort on her part, and that it is justified in some cases while in others it is not.

There is a corollary to this. If the secretary is to take the letter down in person, she must obviously be available for that purpose at the same time the executive is free to dictate. This means that personal schedules have to be coordinated. One or the other—often both—must sacrifice some freedom of work planning.

It is not always the secretary who must make this sacrifice. The typical executive would prefer to dictate when an idea is fresh in his mind, but this may occur when the secretary is not available. It may occur, for example, while the secretary is at lunch, or



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when the boss is working after hours, on weekends, or on a business trip. More conventionally, it may occur at irregular intervals during the working day, when the secretary actually could be called in, but is not summoned because the executive may have found she works better if she can take several letters at once instead of having to run constantly in and out of his office.

So it is evident also that dictation using stenography requires certain scheduling adjustments, in addition to using the stenographer's time twice for each letter. Again the question must be asked, is it worth it? And again the answer depends on the particular situation.

Unfortunately, the problem is complicated by a variety of special circumstances and obscured by a number of individual prejudices.

It may be well to approach the subject first from the standpoint of costs, and then to consider some of the other factors.

Certain of the contributing factors can be analyzed if they are reduced to monetary equivalents. For example, the time of a good stenographer is worth more than that of a typist. Dictating equipment, on the other hand, costs more than a set of shorthand pads. A little figuring could show whether the amount of dictation done by a given office costs more when given to a stenographer or to a machine. Studied strictly from these two factors, it does not require a great deal of dictation to justify the cost of a machine.

Another factor is whether machines, if used, would be assigned to individual secretaries or to transcription pools. Correspondingly, stenographic help may be used on an individual basis or in stenographic pools. Again, the cost of workers in pools can be measured and compared to the cost of individual secretaries, considering both salaries and equipment. Again, it is evident that the pool arrangement makes much more efficient use of the time of each typist or stenographer, assuming there is sufficient dictation to keep her busy, and assuming also that she is not needed for other types of work.

Viewed strictly with respect to salary and equipment costs, there is little doubt that the most efficient use of both time and money is obtained by using machine dictation in collaboration with a transcription pool. But such a conclusion depends on certain assumptions.

The first assumption is that the executive will not require any longer to dictate to a machine than to a private stenographer-secretary. In other words, it is assumed that he will not need her assistance during dictation. He will not ask her for advice, information, or opinions. He will not rely on her to get names and addresses from the files. Moreover, his dictation will be sufficiently clear and complete that it can be transcribed without her having to ask questions. He will not expect her to be able to spell unfamiliar technical terms without his help. He will not depend on her to know, without his having to give specific instructions, whether he prefers his letters closed

with "Yours truly" or "Very truly yours," whether he prefers the beginning of paragraphs indented or flush with the left margin, or whether he has any other personal preferences which a secretary would know about without his having to take the time to explain them. Where a dictator can take shortcuts with his secretary, a time or cost allowance must be made in setting up the comparison.

The second assumption is that the executive knows how to use the machine. It may seem surprising, but many men simply do not know the principles of good machine dictation. Aside from speaking clearly, evenly, with reasonably consistent volume (not dropping final syllables or short words), he must, above all, be able to indicate any corrections and give any necessary instructions on the number and distribution of carbon copies, in a way that will be clear to the transcriber. In particular, corrections must be indicated in such a way that the fact that there are corrections will be evident before transcription begins.

All modern equipment is provided with some means for accomplishing this—correction buttons, log cards, and the like. If they are not used the typist should be able to assume there are no corrections. It should not be necessary for the typist to play the recording through before beginning to transcribe, unless correction signals have been made. Failure of the dictator to recognize this requirement can be very wasteful of the typist's—and his own—time.

He should also preface any instructions to her with the word "Operator," to prevent her from typing remarks intended only for her. He should be careful to spell out any unusual words, so that she doesn't have to make a special call to him for help. He should be particular about numbers and punctuation, to avoid ambiguity.

And, of course, he should exercise ordinary common sense by observing the "end of record" signals and not talking beyond the limits of the recording capacity, by not starting a new letter too close to the end of the record, if it can be avoided, and so on. In other words, if a man is going to use a machine, he should take the trouble to find out how to do it. This is not difficult, but it is often overlooked. This second assumption might be reworded thus: the executive knows how to use the machine so that the typist will not require any more time to transcribe than if she had taken the material by stenography.

The third assumption is that the quality and quantity of the finished work is of the same level as might be expected from a private secretary. In other words, it is not strictly fair to compare the costs of a pool arrangement with those of individual secretaries in this situation unless they can turn out equivalent work. However, if the pool typists come up to reasonable standards, a comparison may still be fair, for most office work does not require really superior typing.

Up to this point, consideration has been given only to the costs of equivalent work as performed by machine and by stenography. There is no real argument about this. It is generally agreed that machine dictation is usually much less expensive than dictation to stenographers. But it would be well to look at some of the other factors that are more difficult to evaluate in terms of cost.

If the secretary's assistance is necessary to the executive during dictation, this may be an overriding factor. However, even the private secretary will take a fair amount of dictation

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which must be classed as routine, and there may be enough of this to justify the use of a machine for it, with the stenographic talent held in reserve for those situations requiring special assistance.

If the peak load problem is more than one secretary can handle quickly, the use of machines should make it easier to distribute the work load to reduce delay in getting work out. Of course, if there is no immediate rush to get the work transcribed, there is no problem. The important fact is simply that if work must be distributed in emergencies, it is easier to do it by machine, since few stenographers can read any one else's notes well enough to attempt transcription.

Similarly, if the executive must dictate at off hours, the matter of his convenience is an important factor. Not only is secretarial help more costly at such times, but failure to obtain adequate secretarial service can be a very expensive matter if the executive is handling important company business. In many such cases, the machine is the only possible answer. It is worth noting that there has been a tendency to make dictating equipment more and more compact in size and lighter in weight. Some of it is frankly designed for portability, with a view to aiding the executive who wants to dictate at home, in a car, on a train, or in a plane.

This virtue of portability also offers other opportunities. Salesmen, for example, can dictate reports while on the road and mail them in to the home office without having to write them out. Or a dictating machine (mounted on a rolling stand, if desired) may be taken into a warehouse for inventory purposes, necessary information being recorded on the machine instead of being written down—which can be an inconvenient process in a storeroom.

There are a number of situations in which the machine can be used for dictation only, without thought of transcription. The executive can leave notes to his secretary by this means. Telephone conversations can be recorded for reference (some machines automatically send out the "beep" required by law). Ideas expressed at informal meetings or conferences can be kept in audible form as long as needed. Other uses can be easily imagined.

In many of these illustrations, the machine accomplishes something that could not otherwise be managed. In such a case, of course, there is no question of making a comparison. The issue merely is whether or not the particular job is worth doing.

Several other points need to be looked at briefly, however. One of these is purely psychological—the mat-

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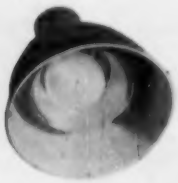

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ter of prestige. In some companies it is a very important thing to have a private secretary, and this privilege is not readily relinquished. In other companies it is less important. Even if one must have one's own secretary, of course, machines still may be used. However, insistence on having a private secretary may prevent the most efficient use of secretarial and executive time.

Another psychological factor is the resistance of trained stenographers to the machine. It is understandable, of course, that a woman would tend to resent equipment that threatens to take the place of her hard-earned skill. This is a matter that can be dealt with only on the individual level. But it is worth noting that many secretaries who have accustomed themselves to the machine have been surprised and pleased at the greater freedom left them to schedule their work.

There is also the question of prejudice for other reasons—resentment of the machine as cold and impersonal, or a memory of unsatisfactory work with machines, which may have been due to inadequate equipment but in many cases is a result of improper use of it.

A more legitimate objection to the machine is that it may intrude on personal privacy, since the records can be played back on any machine of the same design. This might be a factor in handling confidential matters. On the other hand, the executives who deal with such matters are likely to have confidential secretarial help in any case and need not commit private subjects to the machine.

Modern dictating equipment has overcome the significant technical problems. It offers adequate fidelity, and its controls are made simple enough that it is no problem to operate.

A good machine should offer, in addition to fidelity, instant control of starting, stopping, and backspacing. It should be mechanically reliable, so that material is not lost because of machine failure. It should provide for convenient marking of corrections, additional instructions, and letter-length indications. It should allow for convenient and quick changing of the recording medium. In some applications, it may be important that the equipment be small of size and light of weight. Transcription models are considerably enhanced if they have a speed control, so that the playback can be run at the speed most convenient to the typist. Aside from convenience, this feature can reduce the wear on the equipment that results from stopping and starting.

Dictating equipment today generally falls into one of two categories. Machines of one category record on

a medium of plastic or similar material. The medium may take the form of a belt or disk, to suit the design of the individual machine. The sound track is cut into it as a shallow groove, like that on a phonograph record. In many cases the belt or disk can be resurfaced, making it possible to reuse it several more times. Most can be folded, and can be placed in envelopes for mailing. They are easy to use and handle, and the per-letter cost is small, running from a fraction of a cent up.

The other main category of equipment operates on the magnetic principle, which has become familiar through the home tape recorder. Again the media take several shapes, including belts, disks, tapes, and even paper. Since the sound track is in the form of a series of magnetized spots which can be easily removed, the magnetic medium can be reused indefinitely. In practice, the previous sound track is erased at the time new material is dictated. It is thus easy to replace incorrect material by dictating a corrected version over it. Used in this manner, it can provide the typist with an errorless version of the material to be transcribed.

An interesting new development permits the making of two voice records simultaneously. This is possible on a machine using magnetized paper, simply by placing two sheets, instead of one, over the cylinder of the machine. Figuratively speaking, a "carbon copy" is made at the same time as the original. This feature is considered especially useful for men who wish to send original records through the mail; it provides a reference copy at the originating station, as well as a double check against possible loss in the mails.

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Whatever the medium, equipment can be classed in one of four groupings: (1) dictating machines, (2) transcription machines, (3) combination dictating and transcribing machines, and (4) network equipment.

The first three types are very similar. Dictating equipment differs from transcribing equipment essentially in controls and accessories. The dictator, for example, will normally not need foot controls, whereas the transcriber, with both hands occupied at the keyboard, has real use for her foot pedals. On the other hand, the transcriber does not need a microphone, since she is concerned only with listening. The combination unit, of course, has the principal features of both types.

A combination model is normally much less expensive than a pair of dictating and transcribing models. However, it is not as well suited to handling any considerable amount of dictating, for the obvious reason that if the executive is dictating, the secretary cannot be transcribing at the same time. If the executive uses the machine only at off hours, however, or can schedule his work so that it does not conflict with the secretary's needs, it offers much the cheapest means of providing machine dictation service.

The network type offers the features of separate transcription and dictation units, but the transcription unit is remotely located. In the normal arrangement, one or more such units are located in a central transcription pool, with connections from a number of dictating stations, which are normally located on the desks of executives. The dictator, nevertheless, has full control of dictation, including signals for corrections and length of letters. Customarily, the central unit will have features which switch incoming calls automatically from a busy machine to one which is not in use. Incoming calls are usually locked out automatically when the transcribing unit is occupied, and the dictator is notified by signal that the system is busy.

These dictating units usually resemble standard desk telephones. In fact, it is possible to connect an existing telephone system to a transcription pool, with automatic connections to standard dictating equipment.

A modification of the network principle allows an exectutive to dictate from his desk to a remote station on his secretary's desk. This is, in effect, a two-station network, but only one dictating unit is connected to the transcribing machine.

Network dictation is most effective when the men concerned do not keep the equipment busy more than a small portion of the time each. It is usually the least expensive method of providing dictating services in such cases, for it is designed to keep a minimum number of transcribers busy a maximum part of the time. It can be especially helpful if the various executives reach their peak load periods at different times, since it permits each successive busy period to be shared by the entire pool.

The Manufacturers

The following list covers the principal manufacturers of dictating equipment, together with an indication of the types of equipment offered. It will be noted that standard tape recorders are not included, since they normally are not adapted for office work. Where such an adaptation has been made (usually by backspacing, instant stop/start, and/or foot pedal controls), however, tape recorders are included.

The following codes are used:

MB—Magnetic belt machines
MD—Magnetic disk machines
MP—Magnetic paper machines
MT—Magnetic tape machines
MW—Magnetic machines using wire instead of tape
N—Network systems
NI—No information available on current models
PB—Plastic belt machines
PD—Plastic disk machines
TR—Tape recorders modified for office use

American Dictating Machine Co., 65 Madison Ave., New York 16. (MD, N)

Amplifier Corp. of America, Magnematic Div., 398 Broadway, New York 13, N. Y. (MT)

Ampro Corp., 2835 N. Western Ave., Chicago. (TR)

Baltimore Dictating Machine Co., 817 E. 33rd St., Baltimore 18, (NI)

DeJur-Amsco Corp., 45-01 Northern Blvd., Long Island City, N. Y. (MT)

Dictaphone Corp., 420 Lexington Ave., New York 17. (N, PB)

Thomas A. Edison, Inc., West Orange, N. J. (N, PD)

Felt & Tarrant Mfg. Co., 1735 N. Paulina St., Chicago 22. (MB, N)

The Gray Mfg. Co., 521 Fifth Ave., New York 17. (N, PD)

Infra Electronic Corp., Recording Div., Roseland, N. J. (PD)

International Electronics Co., 808 N. Broad St., Philadelphia. (NI)

Magnetic Recording Industries, 11 E. 16th St., New York 3. (MD, N)

Miles Reproducer Co., 812 Broadway, New York 3. (PB)

Oerlikon Tool & Arms Corp. of America, Business Machines Div., P.O. Box 3049, Ashville, N. C. (MP)

Paramount Dictating Machine Corp., 332 Broadway, New York 10, (NI)

Peirce Dictation Systems, 5900 N. Northwest Highway, Chicago 31. (MB, N)

Pentron Industries, Inc., 777 S. Tripp, Chicago 11. (NI)

Scribe Corp., 5022 W. Madison St., Chicago 44. (MT, N)

SoundScriber Corp., 146 Munson St., New Haven 4, Conn. (N, PD)

Webster-Chicago Corp., 5610 W. Bloomingdale Ave., Chicago 39. (MW)

Intercommunication Equipment

COMMUNICATIONS is often described as the nervous system of an organization. It is more than that—it is the circulatory system as well. It provides both the flow of information and the means of controlling it.

Communications encompasses many techniques. At its simplest it may consist of nothing more than a gesture of the hand. At its most elaborate it may require hundreds of thousands of dollars worth of equipment. Its most complicated possibilities have never been explored. But in business of nationwide scope, communications makes use of networks of telephone, telegraph, and teletypwriter lines and equipment, mailroom systems, voice transmission equipment, and specialized devices like conveyor belts and pneumatic tubes.

The category of intercommunica-

tion equipment is limited to those devices which provide for local communications—within a building, or at least within offices in the same local area. It refers essentially to methods permitting instantaneous, or nearly instantaneous, communication.

Most intercom equipment is made for the purpose of transmitting the human voice. Some of it—at least as the term is being used here—transmits light or sound signals. In addition, some specialized equipment has been included in this group, because it serves a very similar purpose. Of these additional types, some transmit written messages electrically, some provide high-speed physical delivery of messages and materials.

Voice transmission is accomplished by equipment of differing types. Three categories will be considered: (1) "wireless" equipment, (2) "direct line" equipment, and (3) equipment connected through a central switchboard, which may or may not be automatically controlled.

The so-called "wireless" equipment, of course, does not operate without wires. It gets its name from the fact that it does not require specially installed wiring. Existing light circuits are used for the purpose, with the units plugging into standard electrical outlets.

Units are usually small and light of weight. Often they have handles and are intended to be carried about from place to place, wherever required. They plug into the outlets with ordinary plugs, like those used for a desk lamp or a small fan.

All units of the same type which are plugged into the same circuit are automatically interconnected. Units not served by the same main power transformer cannot reach each other.

Each unit serves as both speaker and receiver. A message spoken into any one unit is transmitted to all others, and is heard by all. Calls to a station are made by addressing it directly; bells or other signals are not used. It is usually possible to govern the incoming volume at any station to suit individual tastes. Thus the system does not offer much privacy.

It is possible, however, to use several sets of units operating on different frequencies. This permits a degree of privacy to the extent that stations can hear only those stations on their own frequency. Thus, several separate conversations can be carried on simultaneously, but the parties concerned in those separate conversations are never able to contact stations on other frequencies.

Wireless equipment is designed for communication over relatively short distances. Some manufacturers offer boosters to amplify the signals so they may be sent as much as two miles. Various devices are available to reduce interference on noisy circuits. On some models, the user is permitted access to "ground" transmission to assist in long-distance communication and as a means of overcoming the obstacle of intervening power meters.

The wireless principle has been used not only for voice transmission, but for the sending of code signals for paging purposes. Paging equipment will be discussed later in this section.

The benefits of wireless transmission include economy and flexibility and these are obtained at a loss of privacy. Moreover, most equipment of this type is not designed for high-fidelity transmission.

All other types of intercom equipment require the installation of individual wiring. This wiring may be led directly from one unit to another, or it may be brought together at a central switchboard. Equipment of the first type has been referred to throughout this article as "direct line" equipment.

Direct line equipment is available in a variety of designs. In some cases the stations take the form of small cabinets, much like small table radios. In other cases they appear in the guise of telephones.

Cabinets themselves vary in size and appearance. They may be of elegant design, finished in fine woods, or they may be designed for usefulness rather than appearance. A cabinet will have a speaker of some sort, and it may also have a handset for individuals wishing the maximum in privacy.

The handset, if provided, serves, of course, for transmission; otherwise, the user merely speaks into the cabinet.

The direct-line principle permits stations to be called individually and selectively. Thus, as many separate simultaneous conversations can be carried on as there are separate interconnecting lines. Stations are usually called by means of buttons, which ring buzzers, or chimes, or which actuate signal lights at the station called. However, in some cases, units may be reached by voice paging.

The number of stations to which any one unit may be connected is limited to the specific number of terminals provided. Each station is connected directly to each other station. A system may include many more stations than the number which can be connected to any single one, however; in such a case, a station could contact some of these directly, but would have to ask an intermediate station to relay messages to other destinations. Several units of this type can often be interconnected simultaneously for use in conferences.

Where telephone-type equipment is used, stations are usually called by means of buttons. These units, of course, do not have loudspeakers and are compact. Telephones and cabinets can be intermixed in a system.

Direct-line models vary not only in appearance, but in special features. Some of those which can be obtained are devices to lock out incoming calls; "executive right-of-way," which gives priority to an executive's station, "busy" or "in use" signals; "hold-annunciator" feature, which leaves a call to a busy station in a "waiting" status, to be put through automatically as soon as the station called is free; identification of calling stations by means of light signals; and connections with public address systems.

A station equipped for complete control of two-way conversation is customarily called a "master" station. Other stations with less complete facilities may be called "staff" stations. A staff station may consist of little more than a loudspeaker. Often it will be unable to call any station other than a master connected with it. It may serve solely as a listening station. Masters and staff stations can be used in the same system.

As an intercommunication system grows in size, the amount of wiring necessary to connect the various stations grows at an increasing rate. A maximum practical point is thus

reached while the system is relatively small. Few direct-line systems have more than 24 stations, although some have as many as 40. In the larger systems, it is generally preferable to connect each station to a central switchboard, in order to reduce wiring expense.

The most obvious type of switchboard service is that provided by a normal telephone network as installed by the local telephone company. Such service uses a switchboard monitored by an operator. Telephone companies offer a variety of services, many of which are insufficiently understood. Because this type of installation is offered from a public utility, and because it is supervised locally, the reader is referred to his own telephone company for further details.

One of the most useful kinds of intercommunication systems is that type which uses an automatic switchboard. The individual station is usually of the dial telephone type, and other stations are dialed in much the way one would use a standard telephone. Connections are made automatically at the switchboard. The telephones themselves may rest on a desk, or they may be designed for mounting on a wall or on the side of the desk. Some stations combine the telephone with a cabinet containing a loudspeaker.

Such a system can be extremely flexible, and it can handle as many as a thousand individual stations without requiring the services of an operator. The maximum number of stations possible in any given installation, of course, depends on the capacity of the switchboard. Subject to the limitations of the switchboard, such a system can be expanded or reduced as required.

This type of installation provides what is in effect a complete private telephone system, with all the features of normal telephone service. Among these are dial tone, busy signals, and automatic ringing. Conversations are completely private, but conference facilities are available.

In addition, other special features may be included. Among these are "remembering" features for putting through calls to busy stations automatically when the lines become free; monitoring facilities; executive priority; code calling, using light or sound signals; locking out of incoming calls; provisions for dialing selected stations automatically by the use of a key; voice calling of stations; facilities for connecting with public address systems; volume controls; alarm signalling; and facilities for conversing with other stations without touching the instrument.

It is possible to interconnect such a system also with a private two-way voice radio system. This permits contacting moving vehicles directly from a headquarters telephone. Centralized dictation facilities may be incorporated in the network. Other extended uses of the network may include credit authorization systems, such as those using sales slip perforators actuated remotely by the credit authorizer in response to a telephone inquiry.

Because of this wide range of possible features, the concept of "integration," which is so vital a part of current business thinking, can be applied to communications. The potentialities of modern communication systems make it possible to plan new bookkeeping or accounting procedures based on the features of the intercom network.

As an example, it has been pointed out previously in this magazine that intercom systems can be used to simplify such operations as timekeeping. Instead of asking a worker to punch a time clock at the start and finish of a job, he can merely call a central desk, where this data can be recorded by a clerk trained to do it well and accurately. Such a procedure not only spares the worker time and trouble, but it tends to produce more accurate and usable records.

In general, it may be said that whenever a worker, whether in the factory or in the office, is required to make reports that interrupt the work he is doing, the possibility exists of installing some sort of intercommunication system that will permit him to relay the necessary information to a central recording station. The records of a number of workers can be coordinated; the record keeper is likely to be more expert in keeping the records; and the worker's time is saved.

While the equipment so far described is designed primarily for voice transmission, there is an area of operation in which messages can be transmitted successfully by code signals of some sort. Paging systems, therefore, have been included in this category.

The reference here is to paging by means of lights, chimes, bells, buzzers, etc. Naturally, where a code system is to be used, the code, and the type and number of messages which can be transmitted must be simple, to obviate the need of special study to learn a complicated code.

Most paging codes consist of a series of short signals indicating numbers. A buzzer system, for example, may be used to send out a group of two short signals, followed by another short one, to indicate the number 21. Individuals would be assigned their own numbers, and on hearing their code would know that some predetermined action was required of them. Thus, the signal might direct them to call a central station for instructions.

A supplementary code might be sent out instead, to indicate which of several courses of action was called for. One code might announce a visitor, another might signal that a long distance telephone call had come in, another might mean that the person concerned should pick up a telephone and call the company operator, and so on.

Numerical codes may be transmitted manually or automatically. The manual method merely requires pressing a button or switch for each visual or sound impulse. Automatic transmission, which may be accomplished by pressing a lever, or by inserting a plug in a hole, usually requires nothing more than making a selection of the desired code. The code will normally sound as long as the lever is depressed or the plug remains seated.

Some visual paging systems employ numbers flashing on an indicator. In addition, public address systems can be used for voice paging.

The equipment itself may be permanently installed, with direct wires to the receiving stations, or it may be of the wireless variety. The latter is especially useful as a relatively inexpensive means of keeping track of individuals moving about a building. The receiving unit is light in weight and is carried from place to place. At

each stop it is plugged into the regular lighting circuit.

The use of paging systems can take a considerable load off the voice circuits. The systems can also be used in many instances to signal the beginning and end of work periods, rest periods, and lunch periods. Some equipment is also designed for the sending of fire signals and other alarms.

Among other types of intercommunication devices are several specialized systems. One of these, known by the trade name TelAutograph, provides for the transmission of handwritten messages electrically. The transmitting station is provided with a special pen, connected in such a way that its movements actuate pens in the receiving units so that they write duplicate copies of the original message. Messages can be sent to individual stations, or to as many as 32 stations interconnected for conference purposes. In addition to offering instantaneous communication, this method provides written records of all transmissions.

The facsimile method, which is described in the duplicating equipment section of this department, is also used for intercommunications. It is perhaps most familiar as a means of transmitting telegrams between the offices of the telegraph companies and the offices of subscribers to the system. The equipment, however, can be used for intercommunication within a company. It scans written, typed, or printed material of almost any variety, and, using a photoelectric principle, reproduces it at a remote station.

Such equipment has been adapted to a number of interesting systems uses, such as the issuing of railroad or plane tickets from a central office. Some of it can be used for duplicating purposes, either by making duplicate copies directly, or by creating stencils for use on standard stencil duplicators.

Other equipment which may be considered to fall in the intercommunications category includes pneumatic tubes and conveyor belt systems. While these differ from the other equipment described in this section, they do provide high-speed transmission of information. The original material, of course, is physically moved from one place to another.

In the smaller installations, offices may be interconnected directly. In larger installations, offices are usually

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connected to a central station where material is sorted and redistributed to other stations. Some pneumatic tube systems provide for the automatic switching of the message carriers, eliminating manual handling at the central station. Tubes of various sizes and shapes are available.

In general, it may be said that intercommunication equipment is used to increase the speed of communicating (when used as a substitute for mail, messenger service, personal calls, or the like) or to lessen the load on standard communications systems, for the purpose of avoiding bottlenecks. It can free the standard telephone network from internal messages that might interfere with calls outside the company. It also makes it possible for an individual to obtain information from other offices in the company while holding contact with an outside caller, avoiding the inconvenience of calling back.

Beyond these two immediate functions, it also offers possibilities for systems applications which can ease the work load of departments, as indicated in some of the examples cited above.

The Manufacturers

The following list shows the principal manufacturers of intercommunication equipment, with an indication of the type of equipment they offer.

The following code symbols are used:

D—"Direct line" equipment, not connected through a switchboard

M—Miscellaneous, including facsimile equipment, pneumatic tubes, and special equipment

NI—No information available on current products

P—Paging systems

S—Equipment connected through an automatic switchboard

W—"Wireless" equipment

Air Associates, Inc., Electronic Equipment Div., Teterboro, N. J. (M—facsimile equipment)

Auth Electric Co., Inc., 34-20 *45th St., Long Island City, N. Y. (P)*

Automatic Electric Sales Corp., 1033 *W. Van Buren St., Chicago* 7. *(P, S)*

Bell Sound Systems, Inc., 555 *Marion Rd., Columbus* 7, *Ohio. (D)*

David Bogen Co. Inc., 29 *Ninth Ave., New York* 14. *(W)*

Connecticut Telephone & Electric Corp., 70 *Britannia St., Meriden, Conn. (D, P, S)*

S. H. Couch Co., Inc., 1 *Arlington St., North Quincy* 11, *Mass. (D, P, S)*

Dictograph Products, Inc., 95-25 *149th St., Jamaica* 1, *N. Y. (P—special short range radio to lapel speakers)*

DuKane Corp., 103 *N. 11th Ave., St. Charles, Ill. (D, P, S)*

Edwards Co., Inc., 90 *Connecticut Ave., Norwalk, Conn. (P)*

The Ericsson Corp., 100 *Park Ave., New York* 17. *(D, P, S)*

Executone, Inc., 415 *Lexington Ave., New York* 17. *(D, P)*

Federal Telephone & Radio Co., 100 *Kingsland Rd., Clifton, N. J. (P, S)*

Feiler Engineering & Mfg. Co., 8026 *N. Monticello Ave., Skokie, Ill. (W)*

International Business Machines Corp., 590 *Madison Ave., New York* 22. *(D, P—portable)*

Kellogg Switchboard & Supply Co., 79 *W. Monroe St., Chicago* 3. *(P, S)*

Lamson Corp., 10 *Lamson St., Syracuse* 1, *N. Y. (M—pneumatic tube systems)*

Line Electric Co., 1047 *McCarter Highway, Newark* 4, *N. J. (P)*

Mitchell Mfg. Co., 2525 *N. Clybourn Ave., Chicago* 14. *(W)*

National Inter-Communicating Systems, Inc., 1130 *N. Milwaukee Ave., Chicago* 22. *(D, P)*

Radio Corp. of America, Front & Cooper Sts., Camden, N. J. (D, P, S)

Rauland-Borg Corp., 3523 *W. Addison St., Chicago* 18. *(D, P)*

Servus-Fone Div., Motiograph, Inc., 4441 *W. Lake St., Chicago* 24. *(D. P.)*

Mark Simpson Mfg. Co., 32-28 *49th St., Long Island City* 3, *N. Y. (D)*

Wm. M. Smith Co., 20 *Ferguson Ave., Broomall, Pa. (D)*

Stenafax, Div. of Times Facsimile Corp., The Biltmore Arcade, Madison Ave. at 43rd St., New York 17. *(M—facsimile equipment)*

Stromberg-Carlson Co., Sound Equipment Div., 1225 *Clifford Ave., Rochester* 21, *N. Y. (S)*

TN Telephone Sales Corp., 11 *Park Place, New York* 7. *(D, S)*

Talk-A-Phone Co., 1512 *S. Pulaski Rd., Chicago* 23. *(D, W)*

Talk-O-Products, Inc., 163 *St. Paul St., Rochester, N. Y. (NI)*

TelAutograph Corp., 1140 *Crenshaw Blvd., Los Angeles* 19. *(M—equipment for transmitting hand-written messages electrically)*

Vintage Products Co., 1320 *S. Grand Blvd., St. Louis* 4. *(D)*

Vocaline Co. of America, Inc., 100 *Bristol Bldg., Old Saybrook, Conn. (W)*

Webster Electric Co., 1900 *Clark St., Racine, Wis. (D, P, W)*

The Western Union Telegraph Co., 60 *Hudson St., New York* 13. *(M—facsimile equipment)*

The Wheeler Insulated Wire Co., Inc., 150 *E. Aurora St., Waterbury* 20, *Conn. (D—sound-powered phones)*

Integrated Data Processing Equipment

CONSIDERED in terms of its long-range possibilities, the most important advance in office techniques to appear in many years is the phenomenon popularly called automation. Even

though relatively few offices today are in any sense actually "automated", there are few that remain unaware that the advent of automation is a development that will ultimately affect the fundamental nature of their operations.

It is important—and very difficult—to give this phenomenon a legitimate name. The word "automation" has become almost useless, because it means too many different things to too many people. Moreover, it has been overglamorized by headline-conscious press agents, and exploited by advertising copy writers.

The word "electronic" has become similarly confusing, not because its meaning is not specific, but because it has been wantonly misapplied. To add to the turmoil, phrases like "automatic data processing," "electronic data processing," and "integrated data processing" have found their way into popular use and misuse.

To clear the record, let us make a pass at defining automation, and then leave it out of future discussion. The

term originated to signify the automatic handling of materials in a factory. It implied that materials could be moved onto or off of a production line automatically—and that operations on those materials could be controlled automatically.

Extending this concept to the handling of data—which may be considered the "materials" of the office—automation in the office may be described as a technique of processing data automatically. This does not mean mere mechanization, for office machines of one sort or another have been familar for many years. Specifically, it means that those machines are *controlled* automatically. There are many means of accomplishing this, some of which will be discussed in this section.

The term automation is not in any way synonymous with the term "electronics." Automatically controlled machines may be electronic or they may not. The terms are entirely independent in definition. Electronic equipment is any equipment which makes use of vacuum tubes or equivalents, such as transistors.

In the best usage, "electronic" is not synonymous with "electrical," even though a current of electricity involves a flow of electrons. Many pieces of equipment that were long described as "electric" have suddenly become "electronic," not because vacuum tubes or transistors have been added, but because the latter term has become more fashionable.

Thus it follows that automatic data processing is not necessarily the same thing as electronic data processing, for an automatic system can be set up which involves no electronic equipment, and an electronic system need not be automatic. It is true that the two things often do go together, which is one of the reasons the phrases are often confused.

Let it be clear that the one thing that really distinguishes automation and automatic data processing systems from other systems, whether mechanical, electrical, or electronic, is the principle of automatic control, and that any mechanical, electrical, or electronic system may or may not be automatic, depending on whether or not it is controlled automatically.

Integrated data processing, on the other hand, may incorporate automatic, electronic, mechanical, and even manual systems. This phrase is actually quite broad. It comes close to being equivalent to the term automation, for it implies the automatic control of business machines and systems, but it is perhaps more comprehensive, for it also implies that all of the data processing operations of a company—or of a department—have been integrated into a single grand scheme in which data entered into the system at any point can be automatically carried to any other point in the system at which they are needed. In an ideally integrated system, data should be entered only once, and processed data do not emerge except in final form.

In order to achieve such integration, it is necessary for the system to provide some means for repeating by automatic means any data needed more than once. A name and address of a customer, for example, should not have to be separately typed or written on each ledger card, statement, receipt, or other document pertaining to a given purchase, if any way can be found to have that information entered on those records automatically.

It is this automatic perpetuation of repetitive information which is the key to integration in integrated data processing. It is achieved by providing a method by which one office machine can control another.

What this means is that the output from one machine, such as a typewriter, adding machine, or accounting machine, must be produced in a form which can be read by another. The

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data can be entered in punched cards, punched paper tape, magnetic tape, or other medium, in a code which can be interpreted by other machines. The cards, tape, or other media so used are known as "common languages," for they provide communication between machines.

When the phrase integrated data processing first came into public notice, it was closely associated with equipment using five-channel punched paper tape as the common language. Typewriters were equipped to read and punch this tape, the tape could be

fed into teletypewriters and transmitted from one office to another, producing another tape which could actuate such varied equipment as accounting machines, addressing equipment, and computers.

For a long time, therefore, integrated data processing was taken to mean equipment which could read or punch a five-channel paper tape.

Actually, of course, this is a very limited view, for the principle of using a common language between machines is not new. Specifically, this is the same principle that has been employed for many years in punched card systems, where the cards serve as a common language.

Since it is the common language principle which is important, rather than the particular medium of communication which is used, integrated data processing, in the view of this magazine, includes any equipment which can read or produce a common language medium of any type.

It is interesting and significant that many different means have been developed to provide automatic repetition of information. Moreover, information from one medium can be "translated" into other media, so that any machine that can read or produce any one of the media can be incorporated into an integrated data processing system. The principal media now available for common language uses include punched paper tape; edge-punched cards, in which codes otherwise punched in tape are punched close to the edge of the card (for convenience in storage and handling); punched cards; magnetic tape; magnetic codes on paper documents, for reading by special machines; duplicating masters or stencils, prepared automatically; direct electrical signals to typewriters, adding machines, etc., as automatic outputs from some other part of the system; printed numerals, letters, and symbols, where designed for automatic reading by photoelectric "eyes;" and carbon paper or its equivalent (in a broad sense), for automatic preparation of documents.

It will be seen from this list that the theoretical possibilities for combining standard business machines into integrated data processing systems are limited only by the imagination of the makers of machines and of the systems men who install them. Since the means exist for converting from one common language medium into another, any equipment, of any type whatever, that can read or produce a record in any of the common languages can theoretically be integrated into the same data processing system. To be asked to describe all the possibilities would be something like being given a deck of cards and asked to comment on all the possible bridge hands that could be dealt out from it.

The enormous possibilities of integration, therefore, are a problem in themselves. Although many successful integrated installations have been made, each has been a tailor-made job. It is not possible to order a system as one might order a battery of typewriters. The system has to be designed specifically for a given company.

It does not seem unreasonable to suppose that as more and more installations are worked through, a common body of information will be built up which can be drawn on to help newcomers to the field. Even as eminent a man as Dr. John W. Mauchly, the noted pioneer in the design of giant computers, has stressed the importance of working more extensively with computers to find out what they can do. Experience seems to be more important now than mere theory. The same need can certainly be said to apply to even small data processing systems. The truth is simply that man has devised a class of equipment which can do far more things than he has been able to dream of for it to do. A great deal of exploration and education is in order, therefore, before it can be used most effectively.

Naturally, the bulk of practical experimentation has been carried on by large companies which could afford the expense. In some cases the results have been spectacular. In other cases, where companies plunged in without knowing what they were doing, there has been some embarrassing fumbling. Evidently one source of difficulty has been the attempt to get an electronic system to perform every conceivable operation, and it has been found that the cost of programming for all possible exceptions to routine has resulted in unjustified expense and complication.

Nevertheless, skillful use of the new devices has shown so much promise that it is actually becoming dangerous, economically, for companies to defer considering what integrated data processing can do for them. This is so because a company which finds ways to reduce its costs appreciably—as by improving data handling—may acquire a competitive edge which cannot be overcome. This is especially true because of the time it requires to set up a system adequate for a particular company.

It may be said that the theoretical advances in IDP continue at a high rate. New developments are appearing with spectacular frequency. Yet the introduction of IDP insallations is moving somewhat slowly. This slower rate is evidently due to lack of specific information about what

IDP can do. Moreover, so much has been said about the more expensive installations that smaller companies have perhaps been frightened away.

It has been pointed out, in this magazine and elsewhere, that integrated data processing is really a system, rather than a set of machines. The basic principle—automatic perpetuation of repetitive information—can actually be introduced into the simplest of procedures, and it is found in such uncomplicated devices as the manual "one-writing" or "pegboard" system in which several accounting forms are prepared at a single writing.

Of course, such a procedure is very limited, covering only an elementary

payroll, accounts receivable, or similar operation, as it might be handled in a small company. It is not integrated in the sense of being company-wide. Integrated data processing is being discussed here with reference to equipment that can read or produce a common language. It is important to realize, however, that such equipment need not be complicated, and that IDP is not meant only for large companies.

In general, IDP equipment may be divided into five categories: (1) data originating equipment, such as tape-punching typewriters or adding machines, key punches, etc.; (2) data transmitting equipment, such as teletypewriters and associated communications equipment; (3) data processing equipment, such as punched card tabulators, computers, etc.; (4) conversion equipment, such as tape-to-card or card-to-tape converters, devices for reading magnetic spots on paper and creating various common language records from them, etc.; and (5) output devices, such as high-speed printers, "read-out" typewriters and adding machines, etc.

The subject of equipment for integrated data processing will be discussed in somewhat more detail in the February issue of this magazine. Accordingly, the following list of manufacturers contains the briefest of descriptions of the type of equipment offered by each. This information will be amplified next month.

The Manufacturers

Addressograph-Multigraph Corp., 1200 *Babbitt Rd., Cleveland* 17. Punched-tape-reading graphotypes. Punched-card-reading electronic printers (facsimile) for addressing. Offset duplicating equipment.

American Telephone & Telegraph Co., 32 *Avenue of the Americas, New York*. Communications facilities for integrated data processing systems, using punched paper tape. Equipment includes teletypewriter models of various types, tape perforators, switching facilities, sorting equipment, circuits, etc.

Ampex Corp., 934 *Charter St., Redwood City, Calif.* Magnetic tape recording and reproducing devices for analog and digital information. Tape transport equipment.

Anelex Corp., 150 *Causeway St., Boston* 14. High-speed printers reading magnetic tape, magnetic drums,

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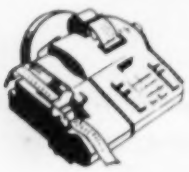
magnetic core matrices, punched paper tape, and punched cards. New magnetic tape transport which advances tape only when data are received.

Bell Telephone Laboratories, 463 *West St., New York.* Research and development work, serving American Telephone & Telegraph Co.

Bendix Aviation Corp., Bendix Computer Div., 5630 *Arbor Vitae St., Los Angeles* 45. Medium-size electronic computers.

Burroughs Corp., 6071 *Second Ave., Detroit* 32. Paper-tape-punching accounting machines. High-speed printers, reading punched cards and capable both of printing and of card-punching. Small (desk-size) electronic computers. Large electronic computers. Equipment for reading printed numbers and punching cards. Equipment of various types working with magnetic codes printed on paper.

Clary Corp., 408 *Junipero, San Gabriel, Calif.* Paper-tape-punching adding machines. Electrical input keyboards. Numerical data printers, operating from computers and other equipment. Time data printers. Printing timers for measuring elapsed time. Electrical output machines, for use with computers, electronic counters, tape- or card-punching devices, etc.



Commercial Controls Corp., 1 *Leighton Ave., Rochester* 2, *N. Y.* "Flexowriters" (typewriters) for reading and punching paper tape and edge-punched cards. Motorized tape readers, controlling Flexowriters, providing information supplementary to data in the tape directly controlling the Flexowriter. Converters from 5- to 6-channel tape, and reverse.

Dashew Business Machines, Inc., 5996 *Smiley Drive, Culver City, Calif.* Automatic embossing machines ("Databossers") reading punched cards, punched tapes, or magnetic tapes, for embossing metal identification or writing plates, and capable of simultaneously attaching tying wires, embossing sequence numbers, notching plates for coding or sorting, etc.

Datamatic Corp., 151 *Needham St., Newton Highlands* 61, *Mass.* (Wholly owned by Minneapolis Honeywell Regulator Co. and Raytheon Mfg. Co.) Electronic data processing systems using special magnetic tape 3 in. wide. Input sources include punched cards; output to punched cards, printers, etc.

The Davies Laboratories, Inc., 4705 *Queensbury Rd., Riverdale, Md.* Magnetic tape data recording systems and components, including converters for card punch input, and recording/reproducing heads.

Dennison Mfg. Co., 300 *Howard St., Framingham, Mass.* "Print-Punch Marking Machines," for preparing pre-punched sales tags for attachment to merchandise to permit subsequent automatic processing of sales data.

Dynamic Analysis Co., Div. of Hall-Scott Motors Co., Burbank, Calif. Current information not available.

ElectroData Corp., 717 *N. Lake Ave., Pasadena* 6, *Calif.* Electronic digital computer data processing systems and accessories. "Datatron" computer is of medium size. Punched cards may be used for input and output.

Electronic Associates, Inc., Princeton Computation Center, Long Branch, N. J. Information on current activities not available at press time.

Electronics Corp. of America, 10 *Potter St., Cambridge* 42, *Mass.* Electronic equipment, called "Magnefiles," for maintaining up-to-date inventory information. Inputs from keyboard, punched tape, or punched cards. Outputs: electric typewriter, punched tape, or punched cards.

Farrington Mfg. Co., 76 *Atherton St., Boston* 30. "Scandex" electronic systems for credit card sales accounting and other uses; designed to "read" printed numbers by means of photoelectric cells, and operate card punches.

Ferranti Electric, Inc., 30 *Rockefeller Plaza, New York.* High-speed tape readers, converting punched tape information into electrical signals for inputs into computers and other equipment.

Fischer & Porter Co., Hatboro, Pa. Units permitting use of standard electric typewriters as automatic data reduction readout devices, with optional paper tape punch.

Friden Calculating Machine Co., Inc., 2350 *Washington Ave., San Leandro, Calif.* Paper-tape-punching adding machines, including new Sales Register model with or without cash drawer. "Computer" equipment, combining a Friden calculator and a Flexowriter, used for writing invoices, etc.

Intelligent Machines Research Corp., 1101 *Lee Highway, Arlington, Va.* Products include components used in such equipment as Farrington's "Scandex" system, referred to above.

International Business Machines Corp., 590 *Madison Ave., New York.* Products include complete line of punched card equipment. Electronic data processing systems of medium and large sizes, including giant 700 series computers, together with accessories. High-speed printers (1,000 lines a minute). "Cardatype," a "one-man" unit for preparing an entire set of related documents at once, using punched cards, punched paper tape, and electric typewriter for outputs. Type 608 transistorized calculator. Typewriters punching cards or tape.

International Standard Trading Corp., 22 *Thames St., New York* 6. (An affiliate of the International Telephone & Telegraph Corp.) Partial list of equipment types: Communications facilities, including teletypewriters. Keyboards for punching paper tape, or to enter data on magnetic tape. Sorting and routing equipment. Automatic inventory systems. Switching equipment.

The Jacobs Instrument Co., Bethesda 14, *Md.* Electronic digital computers.

A. Kimball Co., 444 *Fourth Ave., New York.* Punch marking machines for pre-punching sales data into merchandise tags for automatic processing after sale.

Kleinschmidt, Inc., County Line Rd., Deerfield, Ill. Teletypewriters and other communications equipment for the transmission, reading, and recording of punched paper tape.

Litton Industries, 336 *N. Foothill Rd., Beverly Hills, Calif.* Products include small (typewriter-size) electronic calculators.

Logistics Research, 141 *S. Pacific Ave., Redondo Beach, Calif.* Medium-size "Alwac" computers, operating with punched tape, punched cards, and magnetic tape, as well as with Flexowriters, for input and output. Special purpose inventory systems.

W. S. Macdonald Co., Inc., 33 *University Rd., Cambridge, Mass.* Current information not available.

Marchant Calculators, Inc., 1475 *Powell St., Oakland* 8, *Calif.* "Miniac" electronic data processing systems (small to medium size), with inputs from Flexowriters or other punched tape sources, punched cards, and magnetic tape. Outputs to similar sources or to line printers.

Monrobot Corp., Morris Plains, N. J. Current information not available.

Monroe Calculating Machine Co., 555 *Mitchell St., Orange, N. J.* Adding and accounting machines which punch 5-, 6-, 7-, or 8-channel paper tapes or operate tabulating card punches as a by-product of normal operation.

Mountain Systems, Inc., 864 *Franklin Ave., Thornwood, N. Y.* Special purpose, custom built "Modac" electronic computers of small to medium size.

The National Cash Register Co., Electronics Div., 3348 *W. El Segundo Blvd., Hawthorne, Calif.* Medium-size electronic data processing systems, operating with punched tape or magnetic tape inputs and outputs; printed output available. Punched paper tape recorders, for attachment to bookkeeping, accounting, or adding machines, or cash registers; can convert 6-, 7-, or 8-channel code to 5-channels. Window posters for banks, using paper tape recorders. "Post-tronic" bank bookkeeping machines using magnetic codes on paper. Point-of-sale recorders punching paper tape (now being field tested).

Potter Instrument Co., Inc., 115 *Cutter Mill Rd., Great Neck, N. Y.* Line includes new "Flying Typewriter," a high-speed printing device for printing 36,000 characters a minute from magnetic tape, perforated tape, or directly from digital computers. Components for electronic data processing systems, including random access memory units, magnetic tape handlers, tape readers. Technical developments, such as "Magnistors" to replace vacuum tubes.

Radio Corp. of America, Front & Cooper Sts., Camden, N. J. Large electronic data processing systems—recent U. S. Army "Bizmac" installation was in $4,000,000 class.

J. B. Rea Co., Inc., 1723 *Cloverfield Blvd., Santa Monica, Calif.* "Readix" computers (small size), using punched cards, 5- and 6-channel paper tape, and magnetic tape; designed for automatic floating point and fixed point operation.

Raytheon Mfg. Co. SEE: Datamatic Corp.

Reeves Instrument Corp., 215 *E. 91st St., New York.* No current information available.

Remington Rand, Div. of Sperry-Rand Corp., 315 *Fourth Ave., New York* 10. Line of electronic data processing systems, ranging from large "Univac" models to smaller systems, including Univac File-Computer. Inputs from punched cards, punched paper tape, magnetic tape; also from electric typewriters and other business machines. Various outputs offered. Complete line of punched card equipment.

Scriptomatic, Inc., 300-316 *N. Eleventh St., Philadelphia* 7. Addressing equipment, using the spirit dupli-

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cation principle, equipped with selection and programming facilities for printing, skipping, ejecting, and collecting statistical data from punched cards. Address master cards can be prepared on typewriters reading IDP inputs such as punched paper tape, and from other automatic sources.

Shepard Laboratories, 480 *Morris Ave., Summit, N. J.* No current information available.

Soroban Engineering, Inc., P. O. Box 117, *Melbourne, Fla.* Components for data processing systems, including paper tape perforators, tape readers, keyboards, and various types of output units.

The Standard Register Co., Campbell and Albany Sts., Dayton 1, *Ohio.* "Stanomatic Electronic Code Sensers" for reading magnetic codes on paper and converting into codes for use with reproducing card punches, tape recorders, and other tape reading equipment such as typewriters, adding and calculating machines, teletypewriters, computers, high-speed printers, and memory drums. Also, facilities for testing IDP systems on a workshop basis.

Stanford Research Institute, Menlo Park, Calif. Research and developmental work in IDP. Collaborated in building "ERMA," bank bookkeeping system using magnetic codes on paper.

Systematics, Inc., Hermosa Beach, Calif. Line includes devices for creating punched tape and punched cards from business machines.

Technitrol Engineering Co., 2751 *N. Fourth St., Philadelphia* 33. Components for electronic digital computers in "building block" form, for assembly according to needs of user.

Telecomputing Corp., 12838 *Saticoy St., North Hollywood, Calif.* "Point O' Sale Recorders," for reading prepunched merchandise tags and similar tags, adding supplementary information, and perforating punched tape for further processing. Tape-to-card converters, etc.

Teleregister Corp., 445 *Fairfield Ave., Stamford, Conn.* Special purpose data handling and processing equipment, including automatic reservations systems for transportation companies.

Teletype Corp., 1400 *Wrightwood Ave., Chicago* 14. Communications equipment for the transmission of data in the form of 5-, 6-, and 7-channel codes. Equipment includes tape readers, tape punches or reproducers, teletypewriters, etc.

Underwood Corp., 1 *Park Ave., New York* 16. Complete line of Underwood Samas punched card equipment, using small-size cards. Tape-to-card and card-to-tape punches. Point-of-sale equipment for converting pre-punched merchandise tags into punched cards. Paper-tape-punching typewriters. Slave typewriters. Electronic "Elecom" computers. Typewriters for automatic outputs from instruments.

Victor Adding Machine Co., 3900 *N. Rockwell St., Chicago* 18. Adding and multiplying machines with electrically actuated keys, taking inputs from punched tape readers and punches, tape-punching typewriters, computers, digital weighing scales, production counting devices, and other equipment; can be used to print adding machine tapes or tags and labels.

Wendon Office Equipment Mfg. Co., 17 *Irving Ave., Stamford, Conn.* Portable "Tapecorder" paper tape perforators for punching 5-, 6-, and 7-channel tape; mechanical and electric models.

Western Electric Co., Inc., 195 *Broadway, New York.* (Manufacturing company serving American Telephone & Telegraph Co.)

The Western Union Telegraph Co., 60 Hudson St., New York 13. Communications facilities for the transmission and routing of data in punched tape form. Equipment includes sending and receiving teleprinters, printed tape perforators, switching center equipment, automatic numbering machines, automatic transmitters, sorting devices, facsimile equipment, and circuits.

In addition, duplicating equipment can be integrated into a data processing system, since masters, stencils, etc., can be prepared on tape-reading typewriters. For the names of manufacturers of such equipment, see the section on duplicating machines.

A more detailed listing, including manufacturers of certain types of accessory equipment, will appear in the February issue of *Office Management.*

Bookkeeping and Accounting Machines

A DISCUSSION of bookkeeping and accounting machines and systems is likely to become either very long and detailed or else very general. This is so because bookkeeping and accounting procedures are to be found in almost endless variety, and because the makers of machines have designed their products to be adaptable to that great variety of operations.

Not only are there a number of basic types of machines and systems usable in bookkeeping and accounting, but the more elaborate models are themselves equipped with so many special features and are capable of being adapted to so many different functions, that a full analysis of all the equipment on the market would be hopelessly involved. Such a treatment will not be attempted here.

It may be assumed that a machine or a system of some sort is available to perform almost any bookkeeping or accounting function. There is so much equipment available, in fact, that it is a seriously difficult problem to make a proper selection for any job.

At one time it would have seemed adequate to choose equipment solely on the basis of how well it could perform an existing operation. Thus, the billing department of a department store, faced with the problem of sending statements to its charge customers, might have been convinced that the most helpful equipment it could obtain would be a set of billing machines. Using these machines, the clerks would prepare itemized statements with a description of each purchase.

Today, this arrangement might not be the best possible answer. Some stores—and the principle has been adopted by telephone companies and clubs as well—have eliminated much of the descriptive typing on their statements and instead send notice only of the amounts due. The original sales slips (or long distance call slips, or whatever other records are involved) are sent to the customers with the bills for their inspection.

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How does the store keep its record straight under such a procedure? Instead of manually posting the information, the store microfilms the original records before they are sent to the customer. Thus the equipment required, instead of consisting of a battery of billing machines, might be a microfilm camera and a lesser number of billing machines.

Possibly, as an alternative, the company may prefer to place tags on its merchandise which have been previously coded, by means of punched holes, with certain basic information such as size, style, color, and price. At the time of the sale, such tags may be run through a device which reads the punched code and converts it to a punched paper tape. Additional information, such as salesman's code, date, discounts, etc., may be entered on the same tape by the salesman by means of a simple keyboard at the time of sale. The tape thus resulting may later end up in the billing department and be fed into machines that can read the code and produce the statements automatically. Thus punched tape equipment is required instead of conventional billing machines.

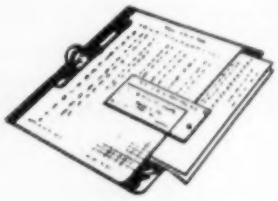
On the other hand, perhaps the thing the company needs most is more billing machines. The microfilming approach might not be practical for the company if its volume of business does not reach a given level. Yet, with the volume remaining at the same level, this might be an entirely reasonable approach if the company were able to use microfilming in connection with the operations of some other department.

Similarly, the use of punched merchandise tags might not be economically justified if they were employed solely to prepare statements. But if other clerical functions, such as maintaining salesmen's records, accounts receivable, sales analysis, and so on, could be performed effectively by punched tape methods, savings in those other operations might be enough to warrant installing the system.

No one would suggest that every store should immediately take steps to convert its operations to some similar system. But there is one point that should be noted. When the operations of a business are viewed *as a whole*—as a set of interrelated and interdependent functions, rather than as a collection of separate and autonomous processes—it is often possible to find means of saving time or money that would not have been evident from a review of any individual operation.

This awareness of the total business is probably the most significant new element in management today. This is the principle of "integration." It is the realization that what one department does has effects on other departments. It expresses itself in the search for an overall system that is greater than the sum of its parts.

So a study of bookkeeping and accounting machines really should come down to a study of systems. It is no longer sufficient to say, "I want such and such a machine for my department." Management is beginning to expect the department head to say, "I want the system which will help my department to do its job most effectively with respect to the rest of the company."



If this discussion has been of a general nature, it is because a review of specific equipment would cover much too much ground for the space available. But it may be useful to look at a few basic categories of equipment.

In the first place, not all bookkeeping or accounting need be performed by machine. Where certain operations repeat themselves continually, as in computing discounts on a relatively few number of standard items, or in determining sales taxes, the use of a single table or chart may be faster and much less expensive than the use of a machine. Tables can be very handy in operations in which complicated fractions must be converted to decimal equivalents. There are many similar uses.

Such tables can often be purchased, or prepared as needed by the individual company. Often such information as overtime computations for small payrolls can be measured by the use of plastic dials sold for the purpose. There are, in fact, numerous scales and dials which can be used in bookkeeping and accounting operations. Adaptations of the engineer's slide rule are also helpful in many cases. While the slide rule cannot be used for addition or subtraction, it can be invaluable in determining percentages, or in calculations involving ratios, as in making conversions from one currency into another.

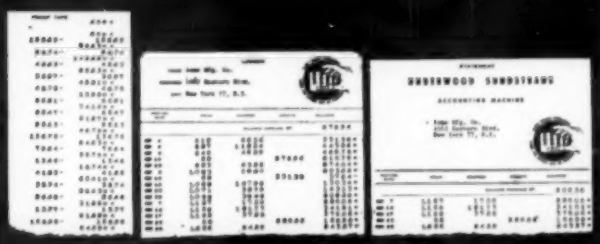
At another level is the manual "one-writing" system—often referred to as the "pegboard" system. A board, equipped with pegs or some similar fastening device, is used to hold several accounting forms in secure registration. The forms are so designed, and so arranged on the board, that when information is written on the top form, portions of it are transferred to the forms below by means of carbon. The spot carbon principle is used, so that only the required information is transferred.

Such systems generally can be used to prepare three or four forms at one writing. Since they are manual, they are not intended for large scale operations, but they can be of great help to smaller offices. Typical applications are the following: (1) Payroll: the check (or cash envelope), employee's pay statement, continuous earnings record, and journal can be prepared at once; (2) Accounts receivable: statement, ledger card, and journal, can be written simultaneously; (3) Accounts payable: purchase or cash disbursement journal, check, and ledger can be created at one writing. Applications to inventory records are also available.

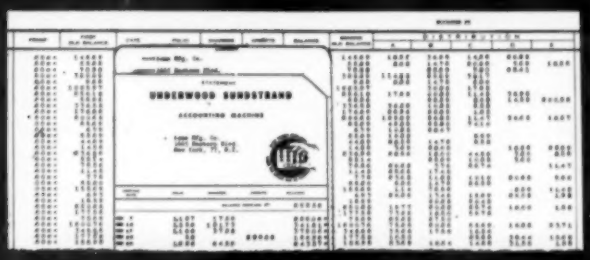
Customarily, after each set of forms is written, the next set can be moved into place easily, with a ratchet and knob, or similar device to set them quickly in proper registration.

Variations of this principle permit similar accounting functions to be performed in a loose leaf binder, rather than on a board.

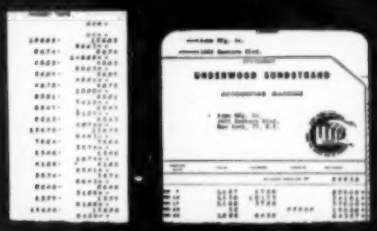
More advanced are true machines, and these are found in many designs, for use in posting, billing, and innumerable other bookkeeping and accounting functions. On all of these machines some computing functions are performed. In certain cases, computation is limited to simple addition and subtraction. In other cases, multiplication and division are possible. Totals may be recorded vertically and/or horizontally; figures in each of sever-



1. Original Ledger and Original Statement with Proof Tape



2. Collated Statement and Ledger with Journal Distribution



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al columns may be totaled, each column having its own register, and the column totals themselves may be combined in an additional register. In addition, many machines have typewriter keyboards, for entering descriptive information.

The number of registers varies from machine to machine, with significant effects on both the price and the usefulness of the equipment. In the more complicated machines, multiplications and divisions can be combined in proper sequence with simple listings and additions or subtractions. Some payroll machines, for example, can compute wages and make tax deductions automatically, at the same time obeying automatic controls designed to prevent overdeduction of Social Security taxes from incomes exceeding $4,200. The equipment may also print new records at the same time.

Because of the many varying applications for which this equipment might be needed, it is made adaptable. It can be "programmed"—that is, instructed to perform certain operations automatically in sequence (such as spacing, adding, subtracting, multiplying, dividing, tabulating, cross-totaling, etc.) for an immense variety of duties.

This may be done in some machines by means of a control bar. A machine may be provided with several such control bars, each determining the correct sequence of steps for a different accounting procedure, to be placed on the machine or removed as required. In other machines, simpler changes in program can be accomplished by the turn of a knob.

Manufacturers of such equipment, naturally, have studied the possibilities of their machines, and are prepared to advise on the best way to use them in various operations. It is to be noted again that the efficient use of these machines depends less on the equipment itself than on the ability to devise systems that will make effective use of the machines. Systems, in other words, continue to be more important than individual machines. Forms design is also important in this respect.

An important development is the adaptation of certain standard accounting machines so that they can enter the results of their work automatically on punched paper tape as a by-product of their normal operation. Thus they join typewriters, adding and calculating machines, and other standard office equipment in the list of machines that can read or punch a paper tape. By means of this "common language" agent, machines of many types can now be coordinated in integrated data processing systems in which machines can turn out tapes for the automatic control of other machines. More is said about this subject elsewhere in this department.

More elaborate even than these machines are punched card systems in which basic data are punched into cards which can actuate machines of diverse types. Punched cards are used for sorting information, for tabulating it, for directing calculations to be made on it, and, in short, can be used to simplify and speed countless accounting functions.

A notable difference between punched card systems and the accounting machines previously referred to is that control of the machines is achieved by means of the punched card itself. Although human means are often used to enter data in the cards originally (this is not required, now that cards can be prepared from punched tapes and other media), the data are themselves entered into the accounting machines without having to be put there individually by human hands. In other words, the equipment is made to accept data automatically from sources previously prepared.

By extension of this concept, it can be said that any machine which creates a punched card can be used to control another machine in the same system. Basically, the automatic control of machines is a fundamental principle of the concept popularly referred to as "automation."

Approached from another viewpoint, the concept of entering data in a form by which the repetitive information is perpetuated automatically is the heart of what is known as "integrated data processing."

The example cited earlier of punched merchandise tags being used to create a punched tape, which in turn could operate accounting equipment, is an example of integrated data processing. Actually, in such a case, the accounting equipment itself might be of the punched card variety, the punched tape having been used, after transmission by teletypewriter or other

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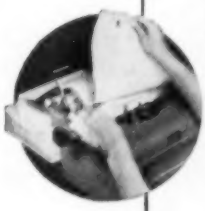

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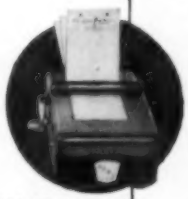

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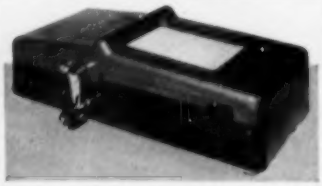

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equipment, to recreate punched cards to control the machines.

Considered in this light, most electronic equipment is in the same category, for it is normally designed for use in IDP systems. There are, however, some electronic computers small enough that they can be considered as complete self-contained units, performing computations very much like those handled by conventional accounting machines. One such computer is about the size of a standard desk, and a very recent model is typewriter size.

The Manufacturers

The list of manufacturers of bookkeeping and accounting machines and systems at the end of this section, therefore, includes makers of punched card and certain electronic equipment, since it is, after all, applicable to accounting and bookkeeping. A more detailed list of manufacturers of integrated data processing equipment will be found elsewhere in this department.

The following codes indicate, in general, the basic types of equipment offered by the manufacturers listed:

BA—bookkeeping and accounting machines not specifically included in the other categories listed—in other words, conventional machines

C—charts, tables and scales for accounting and bookkeeping uses

E—small electronic bookkeeping and accounting systems (complete units, not components)

IDP—bookkeeping and accounting machines which can read or create a "common language" medium for use in integrated data processing systems.

M—miscellaneous

NI—no information available on current products.

OW—"one-writing" systems of the manual variety

P—punched card systems

Addressograph - Multigraph Corp., 1200 Babbitt Rd., Cleveland 17. (P—including combinations with addressing equipment)

R. C. Allen Business Machines, Inc., 678 Front Ave., N.W., Grand Rapids 4, Mich. (BA)

Bates Accounting Forms Co., Inc., 33 W. 42nd St., New York. (OW)

The Blackbourn Systems, Inc., 230 S. Cedar Lake Rd., Minneapolis 5. (OW)

Charles Bruning Co., Inc., 4700 Montrose Ave., Chicago 41. (OW)

Burroughs Corp., 6071 Second Ave., Detroit 32. (BA, E, IDP)

Business Systems Corp., 100 Sixth Ave., New York. (OW)

Calculator Co., Box 1721, Miami Beach. (C)

Delbridge Calculating Systems, Inc., 2502 Sutton Ave., St. Louis 17, Mo. (C)

The Denominator Co. Inc., 261 Broadway, New York 7. (M—special desk-top tabulators)

A. B. Dick Co., 5700 W. Touhy Ave., Chicago 31. (OW)

Ditto, Inc., Chicago 12. (OW)

Evans Specialty Co., Inc., 1800 E. Grace St., Richmond 23, Va. (C)

Felt & Tarrant Mfg. Co., 1735 N. Paulina St., Chicago 22. (OW)

Charles R. Hadley Co., 330 N. Los Angeles St., Los Angeles 12. (OW)

International Business Machines Corp., 590 Madison Ave., New York 22. (IDP, P)

International Payroll Machine Co., P. O. Box 292, Reading, Pa. (NI)

Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif. (E)

The McBee Co., Div. of Royal-McBee Corp., Smith St., Athens, Ohio. (OW)

McMillan Book Co., 701 E. Genesee St., Syracuse, N. Y. (OW)

Monroe Calculating Machine Co., 555 Mitchell St., Orange, N. J. (BA, IDP)

The National Cash Register Co., Main & K Sts., Dayton 9, Ohio. (BA)

Olivetti Corp. of America, 580 Fifth Ave., New York 36. (BA)

Payroll Tax Service, Inc., 44 West 29th St., New York 1. (OW)

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. (BA, OW, P)

The Reynolds & Reynolds Co., 800 Germantown Ave., Dayton 7, Ohio. (OW)

S-K Forms Co., 1619 Walnut St., Philadelphia 3, Pa. (NI)

Safeguard Corp., Lansdale, Pa. (OW)

The Shaw-Walker Co., 1950 Townsend St., Muskegon, Mich. (OW)

The C. E. Sheppard Co., 44-01 21st Street, Long Island City 1, N. Y. (OW)

Specialty Paper Co., 2039 Farrington, Dallas, Texas. (C)

Speedograph, Inc., 5440 S. Ashland Ave., Chicago 9. (OW)

The Todd Co. Inc., 1150 University Ave., Rochester 7, N. Y. (OW)

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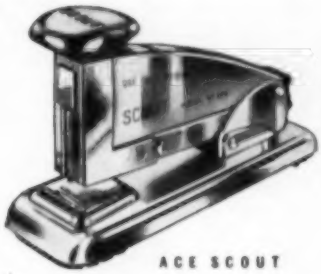
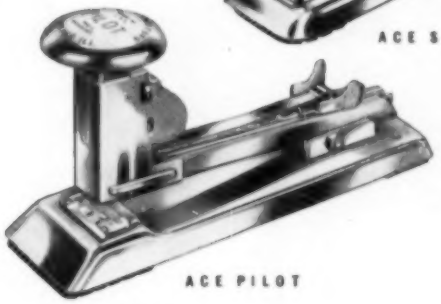
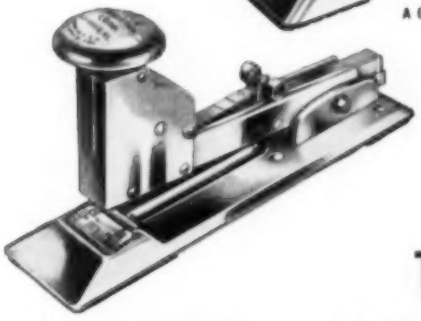


ACE SCOUT



ACE PILOT



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Underwood Corp., 1 *Park Ave., New York* 16. (*BA, IDP, P*)

Visirecord, Inc., 54 *Railroad Ave., Copiague, N. Y.* (*OW*)

Accessory Equipment

The efficiency of a work station is dependent not only on the machines used, but also upon the physical arrangement of the machine and the working areas and files. There has been a tendency to consolidate in single stations both the machines and the storage facilities for records used with the machines, thus giving the clerk complete control of her work.

Accordingly, although space does not permit a discussion of these supplementary facilities, the planning of bookkeeping and accounting work should include consideration of how the equipment can be best arranged. Among the accessory equipment which can be helpful are posting desks, posting trays, and posting stands.

The manufacturers listed immediately below may be consulted for advice on this subject:

Art Steel Co., Inc., 170 *W.* 233rd *St., New York.*

Challenger Steel Products Corp., 350 *Morgan Ave., Brooklyn, N. Y.*

Cronstroms Mfg. Co., Inc., 4225 *Hiawatha, Minneapolis.*

Diebold, Inc., 992 *Mulberry Rd., S.E., Canton, Ohio.*

Intasco Corp., 3450 *W. Division, Chicago.*

Invincible Metal Furniture Co., Manitowoc, Wis.

Jasper Office Furniture Co., P. O. Box 71, *Jasper, Ind.*

Korda Industries, 20 *W.* 46*th St., New York.*

Le Febure Corp., 716 *Oakland Rd., N.E., Cedar Rapids, Iowa.*

Lit-Ning Products Co., P. O. Box 3370, *Fresno, Calif.*

Myrtle Desk Co., P. O. Box 1750, *High Point, N. C.*

National Blank Book Co., Holyoke, Mass.

Norfield Methods & Procedures, Inc., 1159 *S. Humphrey Ave., Oak Park, Ill.*

Peerless Steel Equipment Co., 6600 *Hasbrook Ave., Philadelphia.*

Posting Equipment Corp., 1026 *Niagara St., Buffalo, N. Y.*

The Shaw-Walker Co., 1950 *Townsend St., Muskegon, Mich.*

Vanpe, Inc., 4613 *S. State St., Chicago.*

Watt & Gillogly, Inc., 7 *S. Dearborn St., Chicago.*

Weber Bros. Metal Works, 108 *N. Jefferson St., Chicago.*

Wilson Jones Co., 209 *S. Jefferson St., Chicago.*

Addressing and Mailroom Equipment

A GREAT portion of the work of the office has to do with matter that is basically abstract—the handling of data. For instance, adding, bookkeeping, and accounting machines take numerical data, combine or dissect it, summarize it, recombine it, or develop it into new forms, but throughout the process it remains abstract. Information can be expressed in many different ways without suffering alteration. It can be passed on to others by word of mouth, through communications devices of various sorts, or by being reduced to a physical form, such as a typed or handwritten memorandum or letter, a set of holes in a punched paper tape or card, a series of magnetized spots on a tape or paper, a photographic or other copy of the original information, but the method used does not change the significance of the original data.

The mailroom, on the other hand, is concerned with strictly physical matters—letters, packages, and the like. It must handle these items physically, and the success of its operations depends on its ability to collect, sort, and distribute a purely physical bulk.

Accordingly, its methods are also physical. Postal scales, sorting bins, machinery to fold and insert letters, devices for sealing packages, traveling racks and other equipment to move the mail physically constitute its principal means of carrying out its duties.

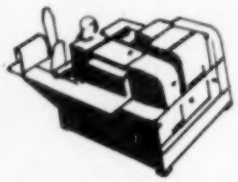
The mailrooom, in other words, is not very much concerned with the kind of activity that is being "automated" today with such spectacular results. It does not deal with data as such.

Yet, like the Scotsman who bought only one spur for his horse on the grounds that if one side went the other would too, the systems people who install new procedures in the accounting or the sales departments find that changes in one department often bring changes in another. These sometimes bring changes in the mailroom.

The average householder, for example, is no longer startled to receive in the mail a bill from his gas or light company in the form of a post card punched full of holes. Nor is it unusual to receive a check, in a window envelope, in the guise of a punched card.

These changes, of course, are evidence of changes in accounting procedures. Somewhere, a systems man has decided that billing or disbursement could be more efficiently handled by the use of punched cards.

But what does this do to the mailroom? One thing at least is obvious: every document that is sent out as a post card, instead of as an enclosure in an envelope, eliminates an inserting operation. Very often it also eliminates a folding operation. And



it is quite probable that it often dispenses with a collating operation as well, for a company can no longer tuck in a leaflet about its operations or services along with the bill.

Moreover, every time a window envelope is used, an addressing operation is discontinued, and, in addition, the chance of putting a check or letter in the wrong envelope is completely eliminated. The original, of course, must be addressed, but not the envelope.

It is true that addressing is not, in the strictest sense, a function of the mailroom, but it is a part of the physical handling of mail, which is why it is included in this category. Time or cost savings in mail handling count to the financial good of the company whether they save the time of a mail clerk, an addressing machine operator, or a secretary.

The addressing process itself has been advanced by a number of step-saving improvements. The preparation of embossed address plates, for example, can be carried out automatically by the use of graphotypes controlled by punched paper tape. Manual embossing, of course, is still standard, but the means of automating it are now at hand. Embossing, including the embossing of labels and tags, can be controlled also by

punched cards or magnetic tape, and in the case of tags intended to be attached to crates or packages, the wiring of the tags can be accomplished automatically at the same time.

Where a punched tape or card, or a magnetic tape can be used to prepare an addressing plate or a label, the addressing operation, of course, has been made automatic. The point that is especially important, viewing the total business operation as an integrated sequence of processes, is that the controlling tape or card can itself be prepared automatically or can be used to direct other operations automatically, or both.

The tape or card serves as a link between various types of office machines—and between different departments. It may have been prepared on a typewriter as a by-product of typing a bill or a sales order, it may issue from the operations of a computer, it may constitute the end product of a teletypewriting process, or it may have been prepared specifically to actuate the embossing equipment. Nevertheless, it is created by one machine to control other machines.

Information in a punched tape can be entered automatically on a punched card or a magnetic tape. Each of the three media can communicate with any other. Thus, any machine which can produce or read one of these "common language" media can be made part of a system in which data can be transmitted automatically from one machine to another. This, of course, is what is usually meant by the phrase, "integrated data processing," and is generally (though not necessarily) what is referred to by the term "automation in the office." By such means, the addressing process can be made to follow automatically as the result of some previous clerical operation.

Still another means of automatic addressing has been achieved by the use of the facsimile method of duplication. A printed name and address is scanned by a light beam which is then reflected into a photoelectric cell. Here it generates an electrical current corresponding in intensity to the degree of light received. The current is directed through a needle passing over another paper in synchronization with the light beam. The current "burns" dark spots into the surface of the copy paper. Since they correspond to the dark areas of the original, the process creates a duplicate of that original at a remote point.

In an electronic addressing unit, the principle can be used in a number of ways. Any written address could theoretically be copied, either directly onto a piece to be mailed, or onto a gummed tape for pasting to the mailing piece.

In one practical application, the name and address are printed on a punched card which carries various accounting information about the addressee. The same types of cards used in accounting can be fed through the machine, eliminating the need for special address cards or plates.

Thus, the advantages of punched card sorting and selecting can be combined with the addressing process, and at the same time a library of special

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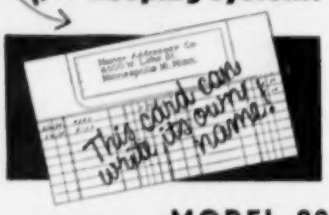

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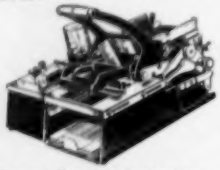

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address plates can be dispensed with.

In a somewhat similar manner, punched cards can be combined with the spirit duplicating process, so that the punched card performs a number of normal accounting functions and also acts as a master for the preparation of addresses. Addresses can thus be prepared selectively through the use of punched card sorting or selection methods.

Moreover, the cards themselves can be produced automatically through the control of punched tapes created at some other point in the data processing system, or they can be prepared as an automatic by-product of a key-punching operation.

The spirit duplication principle, and other duplicating methods also, can be employed to prepare addressing labels simultaneously with various other records. For example, it is possible to type an original master containing name and address, together with information on materials purchased. All or part of this information can be transferred from the master to such documents as shipping tags and labels, duplicate shipping and production copies, order picking copies, delivery copies, duplicate billing, ledger, and collection copies, and unit analysis slips.

In other words, addressing, both of correspondence and bulk mail, can be integrated with the operations of the accounting, billing, or other departments, and a degree of automaticity can be introduced into it because of operations otherwise quite separate from the addressing function.

But, of course, a great deal of everyday addressing needs can be provided for by less elaborate equipment. Addressing devices may be as simple as a hand stamp with a small stencil or spirit master fastened over it for addressing packages.

Other machines use address stencils, spirit masters (some in roll form, others on slips or cards), or plates (printing through a ribbon), and the equipment ranges from simple manually operated machines to large electrically powered units which can select and print names from the master lists, as desired. Features available on some equipment include automatic feeds and perforating devices. In some cases, supplementary information, such as dates or numbers, can also be printed.

Spirit masters will usually give from 50 to 100 impressions, while metal

Advertisement

NEW PAPER CUTTER

Michael Lith, Inc., 145 West 45th St., New York 36, N. Y. offers the low-cost Michael 14" All-Purpose Paper Cutter especially designed for offices with duplicating, small offset and reproduction departments. It is manually operated and will cut a 2" thickness of paper. Of all steel construction with detachable, hollow ground blade, automatic safety latch, balanced lever and adjustable back gauge. The cutter is 26" wide, 22½"

deep and 34¼" high including handle. Cutting width is 14⅛". Inside cutting length, knife to back gauge, is 13¾".

SORTING at its best . . Kohlhaas VERT-A-SORT

ALPHABETICALLY

. . . for fine alphabetical sorting of items preparatory to posting and filing accounts receivable and accounts payable, mail sorting, filing remittances or receipts, etc.

NUMERICALLY

. . . use Vert-A-Sort to sort checks quickly in numerical order, speed sorting of invoices, bills of lading, for terminal digit sorting, etc.

FOR COMPLETE DETAILS

PIN THIS AD TO YOUR LETTERHEAD and mail to:

THE Kohlhaas CO.
8012 S. CHICAGO AVE.
CHICAGO 17, ILLINOIS

FOR MORE INFORMATION USE READERS' INQUIRY COUPON ON PAGE 202

address plates can be used thousands of times. Address cards for use with facsimile equipment, naturally, are not worn out by the copying process itself, and can last as long as any punched card.

A new "transfer" process, somewhat resembling spirit duplication, is also being used for addressing. It is designed to give only two or three impressions from each address; the masters can be prepared directly from punched cards, or they can be typed.

Most standard mailroom equipment is self-explanatory and will not be considered here in any detail. The list at the end of this section indicates eight principal categories of mailroom and related equipment, with addressing equipment included as a ninth. These include the following:

(1) Collators, used for assembling sets of papers in a predetermined order, starting with separate stacks of pages, each stack containing identical pages. The past year has seen the introduction of power-driven equipment at lower prices than were previously available. Collators are of various types, including simple hand- or foot-operated models, and extending to large models which may include such features as stacking units for completed sets, safety devices to prevent skipping or double loading of pages, units for stitching and folding, photoelectric scanning devices to reject blank pages, and other aids to efficient operation. Feeding may be of the friction or suction type. Speeds to 32,000 sheets an hour are claimed for some models.

(2) Folding and inserting equipment. Again, a variety of models are offered. Some folding models make only the simplest folds, while others can make elaborate folds, including right-angle folds. Some models can handle paper as large as 11 by 24 inches. Inserting equipment may merely insert a letter in an envelope or it may incorporate features by means of which it can gather a number of papers, insert them in the envelope,

Cheaper and faster than hand folding!

Even in small offices, hand folding of form letters, bulletins, statements and other enclosures . . . is a time-wasting, expensive operation.

Why not end all this . . . saving time and money, with neater folding . . . by getting a handy little Pitney-Bowes Folding Machine?

This Model FH, for example, handles many kinds of folding jobs. Small and portable, it can be moved around, used by anybody, doesn't need skilled operators, can be set up for any job *in seconds!*

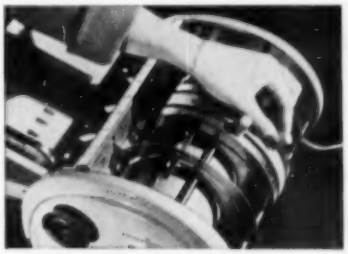
Electrically driven, with semi-automatic feed, it can double-fold 8½ x 11 sheets at speeds up to 5,000 per hour. With automatic feed (optional at small extra cost) it is even faster.

The FH makes eight different folds, handles sheets as small as 3 by 3 inches, up to 8½ by 14 inches . . . in most weights and finishes. It even folds sheets stapled together.

This folder costs less than a typewriter!

Precision-built, long-lasting, indispensable. Yet it *costs less than a typewriter!*

For a demonstration, call the nearest Pitney-Bowes office. Or, send coupon for free illustrated booklet.



Move two knobs on inch scales to fold widths wanted—and the FH is ready to go!

The larger Model FM, fully automatic, folds up to 19,000 sheets an hour.

PITNEY-BOWES

Folding Machines

Made by the originators of the postage meter . . . 94 branch offices, with service in 259 cities in U. S. and Canada.

PITNEY-BOWES, INC.
2911 Walnut Street
Stamford, Conn.

Send free booklet on Folding Machine to:

Name _____

Firm _____

Address _____

MAC THE MAILMAN SAYS:

Speed Mailings, Save Money

with

EUREKA

DUPLISNAP T.M.

Saves time!

Saves money!

They're a snap to use!

- Duplisnaps are carbon interleaved. No carbons required! 33 perforated, gummed labels to a sheet. Each label (2 13/16" x 1") is large enough for a four line address.
- Saves hours of typing — 2, 3, 4, 5 or 6 labels can be typed in one operation.
- Labels typewriter-spaced for quick typing.
- Labels perfectly aligned. Once you co-arrange the top edge of a set with the aligning bar on typewriter no further adjusting needed.
- One quick "snap" removes carbons intact . . . no tedious and time-wasting hand separating is needed. No carbon smudges on labels!
- Each sheet in a set is numbered in sequence on bottom tab . . . simplifies sorting into groups which allows successive mailings to be sent out in an orderly sequence.

For complete details send for your free copy of "Speed Your Mailings" with free samples.

EUREKA SPECIALTY PRINTING CO.
524 ELECTRIC ST., SCRANTON 9, PA.

seal the envelope, print the postage, and stack the finished mail. One folding machine doubles as a letter opener. Designed speeds range from 3,000 to 19,000 pieces an hour, varying with machine, paper size, and type of operation.

(3) Letter opening machines. Models include designs for completely manual operation, others electrically driven but hand fed, and still others which are completely electric and are capable of feeding, opening, and stacking the mail at rates of more than 500 pieces a minute.

(4) Postage metering machines. Postage meters print postage directly on mailing pieces or on strips for affixing to mail. The postage, of course, is purchased in advance from the post office, the amount paid for being entered on the machine's metering unit. (This unit is detachable, so that it can be carried to the post office for setting.) The amount of postage required for a piece of mail is set on the machine; as it prints, the amount is subtracted from the balance set in the meter. The metering mechanism is kept under lock, and its operation is subject to strict Governmental regulation. Postage metering machines generally perform several additional functions. They print a dated postmark in addition to the postage, and may also print a postmark advertisement. They often moisten and seal the envelope. Or they may be incorporated in a large mailing unit which performs the complete mailing operation, beginning with inserting mail in envelopes and ending with stacking it, ready for delivery to the post office.

(5) Postage stamp affixing machines. Such units are intended for mailing operations not large enough to justify the use of a postage metering machine. They are used actually to affix standard postage stamps to the mail, at rates up to 100 a minute.

(6) Postal scales. Scales of the spring type, and of the gravity type (without springs) are available in sizes for letters and packages. A variety of designs permit selection of the postal information arrangement desired. Some indicators are of the pendulum type, some have cylindrical rotating charts, and in certain instances "gun sight" indicators are used to show only one postal zone rate at a time, to reduce the chance of misreading.

(7) Sorting devices. Many sorting

NOW...PRINT FROM ANY *CARD* MASTER TO EVERY TYPE OF MAILING MATERIAL!

New Intermediate SCRIPTOMATIC® MODEL 101 Gives You List Handling Flexibility at Lower Cost

Any punched card (I.B.M., Remington-Rand, Underwood-Sumas) can do double duty as an *addressing master* with this versatile new addressing machine. *Card masters* are fed to the printing head *automatically* to imprint address or other data on booklets, labels, post cards, billing forms . . . almost *any* type of material placed under the printing head! Scriptomatic Model 101 prints at high speeds.

***No more costly metal address plates or fibre stencils.* Each card master may be used for hundreds of clear, clean imprints . . . cards require only 1/6 the space to file!**

***No need to keep duplicate lists.* Punch card masters may be run through high speed sorting machines for selective mailing list requirements!**

Simplify addressing and reduce the cost of handling your mailing lists with the new Scriptomatic Model 101. Investigate the advantages of Scriptomatic methods for your business . . . the machines that print direct from *card masters* with greater flexibility, greater selectivity — at *lower cost!*

® Scriptomatic is a registered Trade Mark

Scriptomatic

SCRIPTOMATIC, INC.
316 North 11th Street, Philadelphia 7, Pa.

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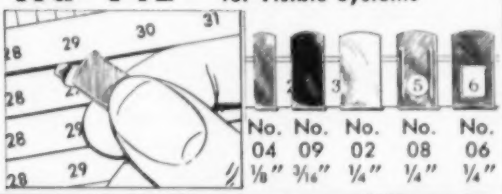
Graffco

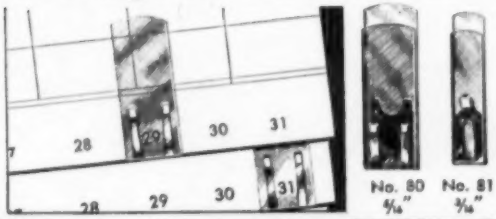
Reminders for every Record System

Nu-Vise METAL SIGNALS for Vertical Records

Nu-Viz METAL SIGNALS for Visible Systems

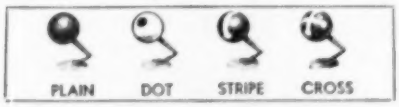


Cellugraf PLASTIC SIGNALS for Visible Systems



Crimpgraf TRANSPARENT CRIMPED SIGNALS for Protected Visible Cards

Maptacks FOR MAPS AND CHARTS



Free Descriptive Folders Sent on Request

GEORGE B. GRAFF COMPANY
54 Washburn Ave., Cambridge 40, Mass.

EVERYBODY MAKES MISTAKES . . .

SMART SECRETARIES CORRECT THEM WITH SINGLEX OR "6587"

Her work is quicker and neater if she uses Eberhard Faber typewriter erasers. She won't hand you smudgy letters for your signature. You won't even notice her corrections. Same gentle red texture in both shapes—won't smudge or damage originals or carbons. "6587" is America's favorite circular eraser—SINGLEX sharpens like a pencil.

Trademarks Reg. U. S. Pat. Off.

Since 1849

EBERHARD FABER

puts its quality in writing

NEW YORK • TORONTO

devices are used in operations outside of the mailroom, but they are grouped here to keep them in one listing. Bins and racks are typical mailroom sorting equipment. Some are mounted on casters for mobility, others have cabinet-type bases or are designed to be mounted on tables. Sorting devices with fingers or dividers are also listed; some of these are simple enough to be used on desk tops; others are large and require special mounting.

(8) Mailroom furniture. This category includes stands, tables, and other equipment. Bins and racks used for sorting, however, are listed under sorting devices.

(9) Miscellaneous. Such equipment as letter sealers, mailbags, stamp vending machines, mailbag holders, tape dispensers, and the like are grouped here.

The Manufacturers

The list which follows covers the major manufacturers of the principal categories of addressing and mailroom equipment. Because of the space which would be required to list all types of equipment which could conceivably be used in a mailroom, the list is not all-inclusive, but it is believed to cover the field with reasonable completeness.

The following codes have been used to indicate the products made by each manufacturer:

A-E—Addressing equipment using an electronic printing process, such as the facsimile method

A-R—Addressing equipment using the relief principle, i.e. printing from plates or type

A-Sp—Addressing equipment using the spirit duplication principle

A-St—Addressing equipment using the stencil duplication principle

A-M—Addressing equipment of miscellaneous other types

C—Collators

F—Furniture for the mailroom, exclusive of sorting racks and bins

FI—Folding and inserting machines

LO—Letter opening machines

M—Miscellaneous

NI—No information available on current products

PM—Postage metering machines

PS—Postal scales

SA—Postage stamp affixing machines

SD—Sorting devices

A.M.F. Systems, Inc., 3026 *Franklin Blvd., Chicago.* (*A-NI*)

Accurate Parts Mfg. Co., 12435 *Euclid Ave., Cleveland* 6. (*PS*)

Addressograph - Multigraph Corp., 1200 *Babbitt Rd., Cleveland* 17, *Ohio.* (*A-E, A-R, A-M—"transfer" process*)

Alden Systems Co., Alden Research Center, Westboro, Mass. (*A-NI*)

Allsteel Scale Co., Inc., 25 *W. Broadway, New York* 7. (*PS*)

Amberg File & Index Co., 1627 *E. Duane Blvd., Kankakee, Ill.* (*SD*)

American Hardware Corp. SEE: *Corbin Wood Products Div.*

Associated Industrial Designers 3726 *Effingham Place, Los Angeles* 27, (*C, SD*)

Better Packages, Inc., Shelton, Conn. (*M—Sealers*)

Bircher Co., 192 *Mill St., Rochester* 4, *N. Y.* (*LO*)

Here are **3** smart ways to speed up your mailings...use **Dennison Addressing Labels**

1. **IN SHEETS.** Most versatile kind of addressing label. Typewriter size sheets for typing and duplicating. Type 33 labels with one insertion in typewriter. Make carbons for multiple mailings. Lint-free; pod-free. 33 labels, $2\frac{13}{16}$" x 1", per sheet.

2. **IN CARBON SETS.** Quick, clean, easy for typing multiple mailings. Four sheets of couponed label paper collated with one-time carbons. Labels stay lined up until snapped apart. 33 labels, $2\frac{13}{16}$" x $1\frac{5}{16}$", per sheet; 132 to set.

3. **IN ROLLS.** Quickest, easiest for one-time mailings. Labels come in continuous strip for convenient typing and attaching. 1000 labels, 3" x 1".

All with Dennison special formula gumming for tight adhesion

At your stationer's or write for the name of your nearest dealer.

Dennison
FRAMINGHAM, MASSACHUSETTS

Blankenhorn Co., Inc., 900 *S. Wabash, Chicago.* (*FI*)

Borg-Erickson Corp., 1133 *N. Kilbourn Ave., Chicago* 51. (*PS*)

Buffalo Scale & Mfg. Co., 46 *Letchworth St., Buffalo, N. Y.* (*PS*)

Roy M. Burtt, 6280 *21st Ave., N.E., Seattle.* (*SD*)

Business Systems, Inc., 310-316 *N. Eleventh St., Philadelphia.* (*A-NI*)

The CADM Corp., 215 *Montrose Way, Columbus, Ohio.* (*C*)

Can-Pro Corp., 19-23 *E. McWilliams St., Fond du Lac. Wis.* (*M—mail bags*)

Cel-U-Dex Corp., 1 *Main St., Brooklyn, N. Y.* (*SD*)

W. A. Charnstrom Co., 305 *S. Fifth St., Minneapolis* 15. (*M—mail bag holders*)

John Chatillon & Sons, 85 *Cliff St., New York* 7. (*PS*)

Collamatic Corp., Wayne, N. J. (*C*)

Commercial Controls Corp., 1 *Leighton Ave., Rochester* 2, *N. Y.* (*LO, PS, SA, SD, M—sealers, mailbags, mailbag holders, stamp vending machines, etc.*)

Cooks', Inc., 207 *Lakeview Ave., Blackwood, N. J.* (*SD*)

Corbin Wood Products Div., The American Hardware Corp., Hornell, N. Y. (*F, SD*)

Cummington Corp., 620 *Commonwealth Ave., Boston.* (*C, FI*)

Dashew Business Machines, Inc., 5886 *Smiley Drive., Culver City, Calif.* (*A—special equipment preparing metal tags from IDP inputs*)

Davidson Corp., 29 *Ryerson St., Brooklyn, N. Y.* (*FI*)

Derby Sealers, Inc., P. O. Box 550, *Derby, Conn.* (*M—sealers*)

Detecto Scales, Inc., 540 *Park Ave., Brooklyn* 5, *N. Y.* (*PS*)

A. B. Dick Co., 5700 *W. Touhy Ave., Chicago* 31 (*FI*)

The Dick Mailer Co., 137 *W. Tupper St., Buffalo.* (*A-M*)

The Elliott Addressing Machine Co., 143 *Albany St., Cambridge* 39, *Mass.* (*A-St.*)

Equipto, Div. of Aurora Equipment Co., 422 *Cleveland, Aurora, Ill.* (*F, SD*)

Evans Specialty Co., Inc.., 1800 *E. Grace St., Richmond* 23, *Va.* (*SD*)

The Federal Equipment Co., P. O. Box 446, *Carlisle, Pa.* (*F, SD*)

William W. Fitzhugh, Inc., 200 *Fifth Ave., New York.* (*C*)

J. L. Galef & Son, Inc., 85 *Chambers St., New York.* (*PS*)

Gardner Laboratory, Inc., 4723 *Elm St., Bethesda* 14, *Md.* (*SD*)

Glue-Fast Equipment Co., Inc., 9-11 *White St., New York.* (*PS, M—tape dispensers*)

Hamilton Specialties, Inc., 5 *Watson St., Boston.* (*PS*)

Hanson Scale Co., P. O. Box 267, *Northbrook, Ill.* (*PS*)

Harris-Seybold Co., 4510 *E. 71st St., Cleveland* 5. (*C*)

Hart Mfg. Co., 2400 *Endicott St., St. Paul* 14. (*A-NI*)

Haskell, Inc., 303 *E. Carson St., Pittsburgh* 19. (*F*)

The Heyer Corp., 1850 *S. Kostner Ave., Chicago* 23. (*A-Sp*)

S. A. Hirsh Mfg. Co., 8051 *Central Park Ave., Skokie, Ill.* (*F*)

Howe Scale Co., 2947 *Scale Ave., Rutland, Vt.* (*PS*)

Insert-O-Matic Corp., 1707 *N. 25th Ave., Melrose Park, Ill.* (*FI*)

Inserting & Mailing Machine Co., P. O. Box 186, *Phillipsburg, N. J.* (*FI, PM*)

Jayem Sales Corp., 230 *Fifth Ave., New York* 1. (*F, M*)

Johnson Research Corp., Bethpage, N. Y. (*C*)

I. J. Knoll Co., 79 *Wall St., New York.* (*FI*)

DO IT THE SENSIBLE
STEN·C·LABL WAY!

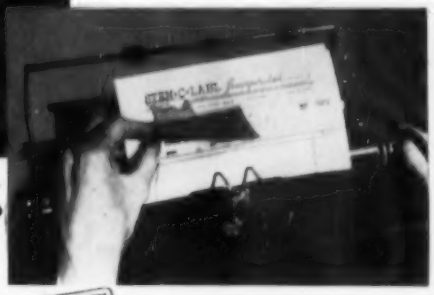
SAVE TIME... COSTLY ERRORS ...addressing multiple shipments as by-product of office procedure

With STEN-C-LABLS, you actually eliminate several steps in the usual multiple addressing process. The STEN-C-LABL is addressed *at the same time* as your invoice, order or bill of lading, whatever your procedure or equipment. Addressing errors, mis-shipments are avoided.

STEN-C-LABLS are sent to shipping department securely fastened to shipping copies. Shipping department makes unlimited impressions direct to PANL-LABL on carton with STEN-C-LABL applicator. You save the cost of buying gummed labels and the time to address and fasten to carton.

Thousands of dollars are being saved by present users by eliminating office addressing of shipping labels and cutting costs on handling of multiple shipments.

STEN-C-LABLS pre-tabbed to continuous forms being addressed on IBM tabulating machine.



STEN-C-LABL being prepared on manual typewriter.

STEN-C-LABLS CAN BE ADDRESSED ON ANY TYPE OF OFFICE EQUIPMENT:
- on manual typewriters
- on electric typewriters and billing machines
- on electric accounting machines
- on Card-o-type
- on Teletype
- on Flexowriter

Learn how STEN-C-LABLS can help solve your multiple shipping problem

Write TODAY for FREE brochure showing detailed operation and actual installations

STEN·C·LABL, INC.

2285 UNIVERSITY AVENUE, ST. PAUL 14, MINNESOTA

STEN·C·LABL WAS FIRST TO DEVELOP:
- a stencil to be tabbed on unit or continuous office form
- a continuous stencil for addressing multiple shipments on manual and electric typewriters and electric accounting machines
- a tabbed-type stencil which can be cut through the ribbon
- the SQUEEZE-FEED type of applicator
- and advertise the PANL-LABL idea

The Kohlhaas Co., 8012 *S. Chicago Ave., Chicago* 17. (*SD*)

Krengel Mfg. Co., Inc., 227 *Fulton St., New York* 7. (*A-R*)

Faltex Div., Lansdale Products Corp., Box 568, *Lansdale, Pa.* (*FI, LO*)

LeFebure Corp., 716 *Oakland Rd. N.E., Cedar Rapids, Iowa.* (*SD*)

Lipton Mfg. Co., Inc., 52 *W. Houston St., New York* 12. (*M—tape dispensers*)

The Macey Company, 4510 *East* 71*st St., Cleveland.* (*C*)

Arnold MacKenzie, Inc., 3133 *Overbrook Drive, Minneapolis.* (*LO*)

Mailers Equipment Co., 40 *W.* 15*th St., New York.* (*SA*)

Markol Metal Products, Inc., 254 *Mill St., Rochester* 14, *N. Y.* (*F, SD*)

Martin-Yale, Inc., 334 *N. Bell Ave., Chicago.* (*FI*)

Master Addresser Co., 6500 *W. Lake St., Minneapolis* 16. (*A-Sp*)

Master Folder Co., 3000 *Woodhill Rd., Cleveland.* (*FI*)

The Mayfair Co., 315 *N. Desplaines St., Chicago* 6, *Ill.* (*PS*)

J. Curry Mendes Corp., 1 *Curry Lane, Canton, Mass.* (*C*)

The Multistamp Co., 527 *W.* 21*st St., Norfolk* 1, *Va.* (*A-St*)

Nashua Corp., Nashua, N. H. (*M—tape dispensers*)

National Address Plate Co., 4615-23 *W. Huron St., Chicago.* (*A-NI*)

Nettle Mfg. Co., 27 *Huntington Ave., Boston* 16. (*A-R*)

Nu-Craft Products Co., 321-327 *Clarkson Ave., Brooklyn, N. Y.* (*SD*)

Office Accessories Corp., 9157 *Las Tunas Drive, Temple City, Calif.* (*SA*)

Oxford Filing Supply Co. Inc., Clinton Rd., Garden City, L. I. (*SD*)

Pelouze Mfg. Co., 1218 *Chicago Ave., Evanston, Ill.* (*PS*)

Pitney-Bowes, Inc., 69 *Walnut St., Stamford, Conn.* (*C, F, FI, LO, PM, PS, M—counting and imprinting machines, mail bag racks, etc.*)

Pres-To-Line Corp. of America, 2239 *Cotner Ave., Los Angeles.* (*LO, M—envelope sealers*)

Printing Devices, Inc., 1705 *N.* 25*th Ave., Melrose Park, Ill.* (*FI*)

The Print-O-Matic Co., Inc., 724 *W. Washington Blvd., Chicago.* (*FI*)

The Recordplate Co., 16 *E. Holly St., Pasadena* 1, *Calif.* (*SD*)

Remington Rand, Div. of Sperry-Rand Corp., 315 *Fourth Ave., New York* 10. (*F, SD*)

Reproduction Products Co., 12790 *Westwood Ave., Detroit* 23. (*C*)

Rex-Rotary Distributing Corp., 19 *W.* 31*st St., New York* 1. (*A-St*)

Rudson-Wood, Inc., 15 *W.* 44*th St., New York* 44. (*PS*)

S & M Distributing Co., 3875 *Garland St., Wheat Ridge, Colo.* (*A-NI*)

Savasort Corp., 530 24*th St., W. Palm Beach, Fla.* (*SD*)

Scriptomatic, Inc., 300-16 *N.* 11*th St., Philadelphia* 7. (*A-Sp*)

Sorter Graf Co., 4044 *W. Jefferson Ave., Detroit.* (*SD*)

Speedo-Sort Co., 4016 *N. Harding Ave., Chicago.* (*SD*)

Thomas Collators, Inc., 50 *Church St., New York* 7, *N. Y.* (*C*)

The Toledo Metal Furniture Co., 1100-1200 *Hastings St., Toledo* 7. (*F*)

Toledo Scale Co., 1083 *Telegraph Rd., Toledo* 1. (*S*)

Triner Scale & Mfg. Co., 2716 *W.* 21*st St., Chicago* 8. (*PS*)

United Equipment Co., 1101 *Lee Highway, Arlington, Va.* (*A-NI*)

The Victor Safe & Equipment Co., Inc., 315 *Fourth Ave., New York* 10. (*SD*)

Watkins Industries, P. O. Box 2621, *Youngstown* 12, *Ohio.* (*SD*)

Weber Addressing Machine Co., 220 *W. Central Rd., Mt. Prospect, Ill.* (*A-Sp*)

Wilson Jones Co., 209 *S. Jefferson St., Chicago* 24. (*LO*)

Chauncey Wing's Sons, 78 *Pierce St., Greenfield, Mass.* (*A-NI*)

Work-Organizer Specialties Co., 4044 *W. Jefferson Ave., Detroit* 9. (*SD*)

Yawman & Erbe Mfg. Co., P. O. Box 880, *Rochester* 3, *N. Y.* (*SD*)

Acoustical Materials; Air Conditioning Equipment; Floor Coverings; Overhead Lighting; Movable Partitions

NO MATTER how well planned are the systems used in an office, no matter how well chosen the machines, no matter how well trained the personnel, the ultimate in office efficiency may not be achieved if the office space itself is not well planned. An office must be "work-conditioned"—it must be comfortable to work in. Otherwise people and equipment do not do their best.

Lighting conditions must be appropriate; air circulation, temperature and humidity must be kept within reasonable limits; the noise level must not be distracting; and the physical arrangement of personnel and their equipment must be designed for efficiency of work flow and general convenience. In other words, the office must be livable.

Accordingly, a number of types of products designed to make office space habitable have been grouped here for brief discussion. (The reader is referred, in addition, to the *Office Layout and Furnishings* portion of this yearbook.)

One reason for the combination of these various items in one article is that many of them interact. For example, certain ceiling designs have been created to provide for lighting, acoustical treatment, and distribution of conditioned air. Or again, a set of three-quarter height partitions installed in a large general area will have effects on lighting, air movement, sound conditioning, and work flow.

It is true that many of the materials discussed here fall properly within the province of the office architect or specialized designer. However, they are included here for reasons of general interest.

Overhead Lighting

The matter of lighting will be considered first. It has been noted that although very poor lighting conditions are self-evident, a less extreme degree of inadequacy may pass unnoticed, yet be capable of inducing eye fatigue and loss of seeing efficiency over a period of time.

It is generally considered that the eyes work most comfortably when the brightness of objects within view does not vary too greatly from one to another.

Several means of bringing the range of brightness within acceptable limits have been recommended by the Illuminating Engineering Society:

The first is to reduce the actual brightness of light sources by shield-

New, Unique Installation of Acousti-Celotex Tile Permits Completely Flexible Integrated* System

Sinclair Oil Building, 155 North Wacker Drive, Chicago
Owner: John W. Galbreath & Co., Inc. • Architect: Holabird & Root & Burgee
Builder: Turner Construction Company • Acoustical Contractor: James L. Lyon Co.

Sinclair Oil's New Chicago Headquarters... Sound Conditioned, Light Conditioned, Air Conditioned

Throughout the 200,000 square feet of this outstanding new Chicago office building, the use of Acousti-Celotex Mineral Tile on the Acousti-Line® Suspension system, achieves three purposes: Besides completely sound conditioning every office on every floor, this efficient system allows complete flexibility of lighting fixtures and air conditioning diffusers.

Light fixtures may be taken out or relocated, direction of lighting changed. Air diffusers and ducts, in fact *any* ceiling element can be rearranged with minimum labor to suit the needs of the occupants. Because of exclusive Acousti-Line® Suspension, easy removal of tile at any point in the ceiling provides immediate accessibility to above-ceiling space for servicing utilities.

Improved Employee Efficiency—A ceiling of Acousti-Celotex Tile checks routine noise of machines and conversation in general and private offices, corridors and conference rooms. The result is reduced error incidence, lessened overtime, an overall increase in productivity.

Easily Maintained—Once installed, Acousti-Celotex Tile requires no special maintenance thereafter. It is of high sound-absorption value, has a surface of unusual beauty. And it can be washed *repeatedly* and painted *repeatedly* without affecting its sound absorbing properties.

* Acousti-Celotex incombustible Perforated Mineral Tile is installed on the Celotex Acousti-Line® Metal Suspension Ceiling, where tiles, light fixtures, and air diffusers become interchangeable parts of the ceiling. When a new arrangement is desired, units can be quickly, easily, *economically* relocated.

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ing them and diffusing their light. (This recommendation obviously does not mean to use less light, since the normal lighting of offices is less, instead of more than adequate.)

Second, if the light sources cannot be reduced to acceptable values of brightness, the work and the light sources should be so positioned with respect to each other that reflections from the light source will be away from, rather than toward, the worker. As an example, an overhead light should be above, or very slightly behind, a worker seated at a desk, rather than at a point in front of him. Of course, it should not be far enough behind him to cause shadows.

Third, light-colored matte finishes should be used on all room surfaces, to reduce reflections. In particular, desktops should not be shiny (glass tops are especially offensive in this respect). Desk tops should not be too dark. Colors of wall surfaces and ceilings should be chosen with lighting needs in mind. Ceilings should be light in color.

Dull paints reduce glare

Fourth, dull-finish paint should be used on business machines. Bright metal trim on equipment can cause disturbing reflections, and should not be used. Glossy paper should also be avoided if possible.

Fifth, light sources should be so spaced as to provide the most even possible light distribution.

The technical considerations are somewhat beyond the scope of this article, but for reference, the Society's recommendations for lighting for various types of operations are listed here:

For "difficult seeing tasks," such as auditing and accounting, operating business machines, transcribing and tabulating, bookkeeping, drafting, and designing, 50 footcandles of light should be provided.

For "ordinary seeing tasks," such as handling general correspondence or mail, and most general office work, including that of active file rooms, conference rooms, and private offices, the recommendation is 30 footcandles.

For "casual seeing tasks," such as seeing in reception rooms, inactive file rooms, stairways, washrooms, and other service areas, 10 footcandles should be allowed.

For "simple seeing tasks," such as seeing in hallways, corridors, and passages, the minimum value should be 5 footcandles.

The Society points out that these are the values which should be *maintained*, and that because lighting will be impaired by dirt collection in lamps and luminaires, atmospheric dust, decreases in light output from aging lamps, reduction of reflection from walls and other surfaces as dirt accumulates on them, etc., the values provided by a lighting system as originally installed should be somewhat higher than those given.

Overhead lighting fixtures are found in many styles, some for incandescent, some for fluorescent light. They may be mounted flush with the ceiling or suspended below it. In some installations, generally referred to as luminous ceilings, a translucent plastic ceiling is suspended below the light fixtures to distribute the light evenly throughout the area below.

Aside from providing even light in an office, closely spaced fixtures provide some insurance against introducing unwanted shadows when partitions of the movable type are installed. If the light from overhead is reasonably uniform, partitions may be moved at will without taking into account the availability of light.

Some installations of luminous ceilings are designed to serve multiple purposes. For example, acoustical baffles can be provided at intervals to absorb sounds reaching the ceiling. Such baffles generally consist of shallow panels projecting below the ceiling at right angles to it. Generally they intersect each other at right angles, and in some installations some of the junctures are used to provide outlets for conditioned air while others may contain water sprinkling fixtures for fire protection. In other cases sprinklers may be placed above the luminous ceiling, because the plastic panels will sag in case of excessive heat and drop free of their mountings, to permit the sprinklers full play on the space below.

Sound Control

Sound control, like noise control, is important to office efficiency. Acoustical treatment is most often found in ceilings, but it is also applied often to walls. The plastic sheets used in luminous ceilings are not as sound-absorbent as acoustical tiles, which is why acoustical baffles are often used with such ceilings. In many cases, especially where exposed luminaires and other fixtures are used, the ceiling can be treated with acoustical tiles and with other sound insulation materials. Tiles can be affixed directly to a ceiling, but they may often be suspended below it. In the latter case, grid systems are suspended from above, the tiles resting in channels.

Acoustical tile can be decorative

Where suspended systems are used, they can be fitted around overhead lighting fixtures so that the surfaces of the fixtures are flush with the ceiling.

Acoustical tiles are available in numerous styles and colors, for use in various interior designs. Some tiles are perforated according to regular patterns, others have the appearance of random perforations, and still others are not perforated at all, but provide "pockets" for sound absorption in striations, "textured" patterns, and other variations. Some tiles have a smooth plastic surface, with sound insulation immediately behind it; the surface is designed to pass the sound on to the absorbent inner material without reflecting it.

In addition to ceiling and wall treatments, acoustical applications are sometimes made to movable partitions, some designs of which provide for acoustical panels. Such partitions tend to reduce the sound transmitted through them; they do not, however, prevent sound from being sent to the ceiling and reflected down to the other side. Thus, partitions can be useful in noise reduction, but if sound control is important, the ceiling should also be treated.

In addition to this type of acoustical treatment, some sounds can be reduced by the installation of shields around noisy equipment, and by mounting such equipment on rubber or other sound-absorbing materials.

From a practical point of view it may be simpler to move noise-producing machines out of a general office area into a smaller insulated room than to attempt to soundproof the larger area. But such factors as work flow are also involved.

Movable Partitions

Movable partitions have a number of uses. Essentially they are used as substitutes for permanent partitions. They offer ease of installation and removal, for they can be set up and

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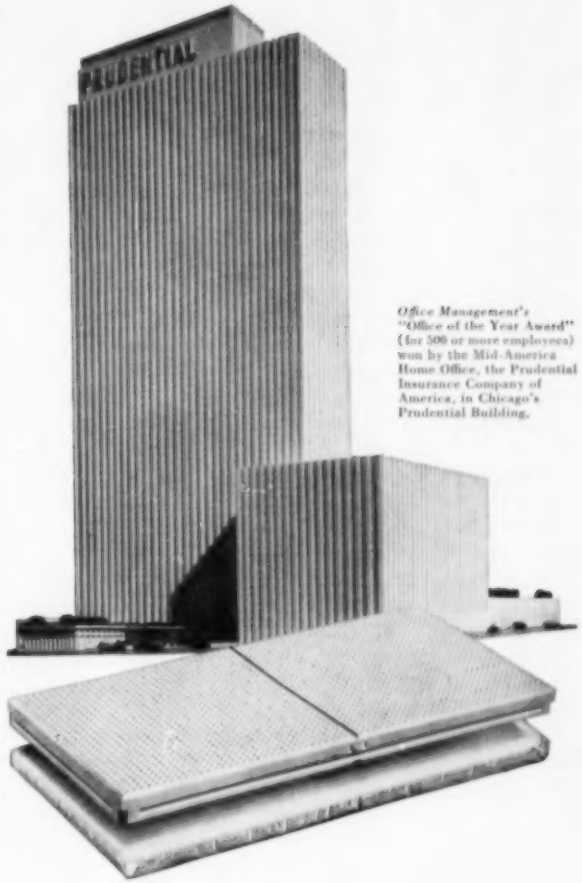

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taken down as required. This is not a matter of simply pushing them around, for they are usually bolted to the floor, and sometimes to the ceiling also. Adjacent partitions are usually bolted to each other as well. Some, however, stand freely. Moreover, if electrical wiring has been installed in them, rearrangement of partitions is not as simple as it may seem. On the other hand, movable partitions are much less troublesome and expensive to rearrange than permanent partitions, and they serve many of the purposes of permanent partitions quite effectively.

Partitions are used most commonly to provide a degree of privacy. Modern offices often consist of a series of enormous open work areas, with relatively few private offices actually built in with permanent partitions. The movable partition provides the individual private offices required without necessitating structural alterations.

This privacy, however, is not as complete as is offered by a partition of masonry. It may be reasonably complete, if the partition extends to the ceiling and is provided with soundproofing materials. Partitions of less than ceiling height may reduce, but not eliminate, the transmission of sound from the space within. As pointed out above, acoustical treatment of the ceiling is often necessary to reduce sound transmission across such partitions.

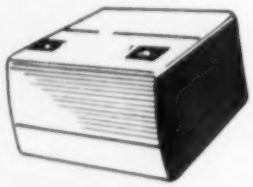
Visual privacy varies with the particular design. Some partitions have panels of clear glass, others have translucent glass, while others are of solid construction and admit no light whatever. Some are installed with open ends, while in other cases doors are provided.

Partitions may be made of steel, plywood, special wood compositions, and combinations of these with glass, acoustical panels, and other materials. They may be of railing height, or of varying heights ranging to full ceiling height. Various special panels and accessories may be attached, such as blackboards, shelving, bulletin boards, pegboards, etc. Raceways for electrical wiring may be provided, as well as electrical outlets.

In some cases partitions are designed for direct attachment to furniture. The simplest of these are small panels fastened to the backs of desks or counters. Other partitions are designed for use either with the furniture or without it. Often they are designed with modular furniture in mind, particularly the type of desk and counter arrangement which takes an L-shape.

The use of partitions must take into account the available lighting arrangements. If the overhead fixtures are widely spaced, it may be that partitioning installed in some locations will throw shadows alongside one or more of the partitions. Where the overhead lighting is even, there is no problem.

Similarly, partitions must be located with respect to existing electrical outlets. Again, this may be no problem, for in many modern and renovated buildings, electrical connections are provided frequently on a modular basis to care for just situations.



One other problem should be looked at, however, and that is the matter of air circulation. If the building is up to date and the air conditioning has been designed, like the electrical and lighting facilities, on a closely-spaced modular basis, introduction of partitions is likely to cause no difficulties. Nor is there any problem if individual room air conditioners are used.

However, where such facilities are not available, the introduction of partitions may interfere with air flow. Full height units may be impractical for this reason, whereas half- or three-quarter-height partitions may cause no inconvenience. Considered from the other point of view, however, most such partitions allow for much better air circulation than do permanent partitions.

Aside from considerations of privacy, partitions can be invaluable in guiding the flow of office work.

Air Conditioning

Air conditioning is, of course, a field in itself. It should be realized from the outset that the comfort of a room is not dependent solely on the temperature. While temperatures should of course be maintained within minimum and maximum limits, humidity must also be kept within limits, for too little moisture in the air may be as uncomfortable as too much. In addition, air should be kept in motion; in particular it should be exchanged with fresh air. And a final point should be noted: conditions that are comfortable for a seated worker will probably not be comfortable for an individual who is physically active.

Thus, a number of means are available for improving physical comfort on a warm day. If an air conditioning system is used, the factors of humidity and air circulation will be controlled by the system in addition to that of temperature. Lacking cooling facilities, however, a hot, moist room can be made more comfortable by using a dehumidifier, or a dry room can be made more bearable by introducing moisture with humidification equipment. In addition to, or in lieu of, these devices, the air can in any event be circulated by means of a fan or air circulator. But again it should be pointed out, a change of air is important, and wherever possible fans should be located near windows or other fresh air sources.

Air conditioning equipment is available in various sizes and designs. Most of the smaller units are air cooled and require installation where they can obtain fresh air either through a window or through a duct. Most of the larger units, on the other hand, are water cooled and require a source of water. For purposes of water conservation in areas where the water supply is limited, the water may be led from the conditioner to a cooling tower, located on a roof or setback of the building, where it can give off the heat absorbed from the conditioner before being led back to repeat its cooling function.

The smallest type is the room air conditioner. Most of these are designed to be seated in a window. Some of these may be adjusted so that the unit is flush with either the inside or outside wall; or they may be placed at various points between the two limits. The degree of adjustability varies with the particular model. Some cannot be adjusted at all. Other room air conditioners are of the console type, standing on the floor, but they nevertheless require a source of outside air, and are commonly located near windows, though not necessarily.

Larger units, if they are self-contained, are usually referred to as "package" units. This term distinguishes them from the large cen-

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tralized installations in which the various components are installed separately, as in air conditioning some large buildings. Package units may be of a size large enough to condition a large general office area, and an entire building can be conditioned by the use of several package units, installed in appropriate locations. Such units are usually water-cooled.

A large central installation may be designed specifically for a given building; such a system often requires extensive structural accommodation in the design of the building.

The capacity of an air conditioner is generally indicated in one of three ways. The term "ton" as applied to a unit, refers to an amount of cooling equivalent to that provided by the melting of a ton of ice over a period of 24 hours. Thus, a one-ton air conditioner would provide the same cooling effect that could be expected from melting a ton of ice in the same room over the course of one complete day.

The term "horsepower" refers to the power of the compressor motor. (The power of the fan motor is usually much less.) It happens that a one-horsepower compressor will provide cooling effects roughly equal to those derived from the melting of a ton of ice each 24 hours. Therefore, the terms "ton" and "horsepower," as applied to air conditioners, are approximately equivalent.

Neither term is strictly accurate, and both are used only to indicate approximate capacities. The more scientific measurement of cooling capacity is expressed by the number of British thermal units that can be dispelled in one hour by the conditioner. Roughly speaking, a one-horsepower (or one-ton) model will dispel 12,000 B.t.u. per hour. These equivalents are adequate for non-technical discussion. It can be shown, however, that the B.t.u. rating is the most accurate index of the capacity of a conditioner.

It is important to realize that a unit which cools one room satisfactorily will not necessarily cool another room of equivalent size as well. Some of the factors that determine the effectiveness of a particular installation are the type of wall construction surrounding the room; the proximity of air-conditioned or non-air-conditioned rooms above, below, and adjacent; the number of

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walls having a sun exposure; the percentage of wall space given to windows; the number of persons using the room, and the degree of their physical activity; and the presence or absence of heat-producing machines or other equipment.

Therefore, the advice of an expert should be sought before making an installation. A unit should be neither too large nor too small if it is to provide proper cooling. If it is too large, its dehumidifying functions may seem out of balance with the cooling functions; if it is too small, it will cool effectively only those areas near the installation.

Additional features are available which can improve the performance and convenience of an installation. If a thermostat is used, the equipment will run only when it is needed, and will shut itself off or turn itself on as required. Heating units may also be included, either of the heating coil or the reverse cycle type, to take the chill out of unexpected cold snaps. Reverse cycle units work on the principle of taking warmth from the outside air and moving it inside, as opposed to moving heat from inside to the outer air; even in relatively cool air, there is enough heat to make this process effective, although it is less efficient when outside temperatures are below 40 degrees Fahrenheit.

In addition, timing units, to turn the equipment on and off at predetermined times, can be of value. It may be observed that a unit adequate to cool a given office will take some time to reduce the temperature to the desired level on a hot day. If it is not turned on until the office opens, employees may be displeased with it. It may seem—erroneously—that a larger model is required. However, if it is turned on in advance, the office can be cool when the workers arrive.

Floor Coverings

Besides the products mentioned so far, floor coverings can make a useful contribution to the livability of an office. Floor coverings include many different products, such as tiles, linoleum, and carpeting.

All of these may be chosen for their decorative values, many designs and colors being available. Carpeting, of course, is looked upon as a sign of prestige. There is no denying the richness of effect produced by a good carpet. Apart from its appearance, however, it can be of help in reducing the noise level, for it is highly sound-absorbent. It also eliminates glare from light sources, and can therefore be helpful in maintaining good light conditions. It is also probably true that good carpeting, properly treated, maintains its appearance longer than materials which, when scuffed, show their wear noticeably. The life of carpeting, of course, is prolonged by the use of appropriate cushioning.

Tiles and linoleums have the great virtue of being relatively easy to maintain; they are, moreover, less expensive than good carpeting. They are also more durable where traffic is heavy or where machines are being moved about. In addition, they are less subject to staining. New designs this year include shapes resembling wood flooring.

In addition to these materials, other flooring products are offered, including plastic floor coverings applied with a trowel.

The Manufacturers

The following list of manufacturers indicates the principal makers of the types of products covered in this section. The major categories are listed separately, with basic types of products indicated for each manufacturer.

Acoustical Materials

Accesso Systems, Inc., 4615 *Eighth Ave., N. W., Seattle* 7.

Armstrong Cork Co., 1010 *Concord, Lancaster, Pa.*

Burgess-Manning Co., 5970 *Northwest Highway, Chicago.*

The Celotex Corp., 120 *S. LaSalle St., Chicago* 3.

Cupples Products Corp., 2650 *S. Hanley Rd., St. Louis.*

Fir-Tex Insulating Board Co., St. Helens, Ore.

Insulite Div. SEE: Minnesota & Ontario Paper Co.

Johns-Manville, 22 *E. 40th St., New York* 16.

Luminous Ceilings, Inc., 2500 *W. North Ave., Chcago* 47.

Keasbey & Mattison Co., 1955 *Butler Ave., Ambler, Pa.*

Mid West Noise Control Co., 6265 *Carrolton, Indianapolis.*

Minnesota & Ontario Paper Co., Baker Arcade Bldg., Minneapolis.

National Gypsum Co., Inc., Baker Bldg., 325 *Delaware Ave., Buffalo.*

Owens-Corning Fiberglas Corp., 1833 *Nicholas Bldg., Toledo.*

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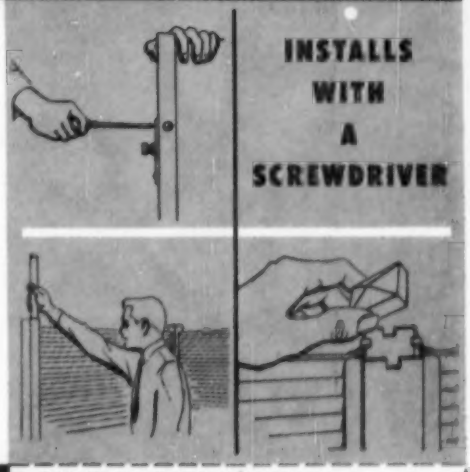

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Virginia Metal Products Corp., Orange, Va.

Wood Conversion Co., 156-4 *First National Bank Bldg., Minneapolis.*

Air Conditioning Equipment

The codes used in this list are as follows:

AC-CA—Air conditioners—console models, air cooled

AC-CH—Air conditioners — equipment combined with central heating facilities

AC-CW—Air conditioners—console models, water cooled

AC-W—Air conditioners—window-type

D—Dehumidifiers

F—Fans, air circulators, and similar equipment

H—Humidifiers

M—Miscellaneous

NI—No information available on current models

Abbeon Supply Co., 179-15 *Jamaica Ave., Jamaica, N. Y. (D, H)*

Admiral Corp., 3800 *Cortland St., Chicago* 47, *(AC-W)*

Ajay Mfg. Co., 331 *Southwest Blvd., Kansas City* 8, *Mo. (M—simple cooling unit for attachment to fans)*

Amana Refrigeration, Inc., Amana, Iowa. (AC-W)

American Blower Corp., Detroit 32. *(AC-CW, D, F)*

Amic Mfg. Corp., 21-25 *44th Ave., Long Island City* 1, *N. Y. (AC—for "built-into-wall" installation)*

Argus Mfg. Co., 1134 *N. Kilbourn Ave., Chicago. (F)*

Bar-Brook Mfg. Co., P.O. Box 738, *C. G. Station, Shreveport, La. (F)*

Berns Mfg. Co., 1605 *Central Ave., Far Rockaway, N. Y. (F)*

Bryant Heater Div., Affiliated Gas Equipment, Inc., 17825 *St. Clair Ave., Cleveland* 10, *Ohio. (AC-CA, AC-W)*

Burnham Corp., Box 351, *Zanesville, Ohio. (NI)*

Carrier Corp., 300 *S. Geddes St., Syracuse* 1, *N. Y. (AC-CA, AC-CH, AC-CW, AC-W)*

Chelsea Fan & Blower Co., Inc., 639 *South Ave., Plainfield, N. J. (F)*

Chrysler Corp., Airtemp Div., 1600 *Webster St., Dayton* 1, *Ohio. (AC-CW, AC-W)*

Circle Air Industries, 244 *Herkimer St., Brooklyn, N. Y. (AC-CH)*

Commander Mfg. Co., 4225 *W. Kinzie St., Chicago. (F)*

Cory Corp. See: *Fresh'nd Aire Co.*

Crosley Div., Avco Mfg. Co., 1329 *Arlington Ave., Cincinnati. (AC-W)*

Curtis Mfg. Co., 1905 *Kienlen Ave., St. Louis* 20. *(AC-CW, AC-W)*

Daffin Mfg. Co., Lancaster, Pa. (H, NI)

Dayton Electric Mfg. Co., 748 *W. Adams St., Chicago* 6. *(F)*

Dearborn Stove Co., 1700 *W. Commerce St., Dallas* 2, *Tex. (NI)*

The Deering Air Conditioning Co., 1069 *Celestial St., Cincinnati. (NI)*

Diehl Mfg. Co., Finderne Plant Somerville, N. J. (F)

Drayer-Hanson, Inc., 3301 *Medford St., Los Angeles* 63. *(AC)*

The Ebco Mfg. Co., 265 *N. Hamilton Rd., Columbus, Ohio. (D)*

Electriglas Corp., Bergenfield, N. J. (AC-NI)

Emerson Electric Mfg. Co., 8100 *Florissant Ave., St. Louis* 21. *(F)*

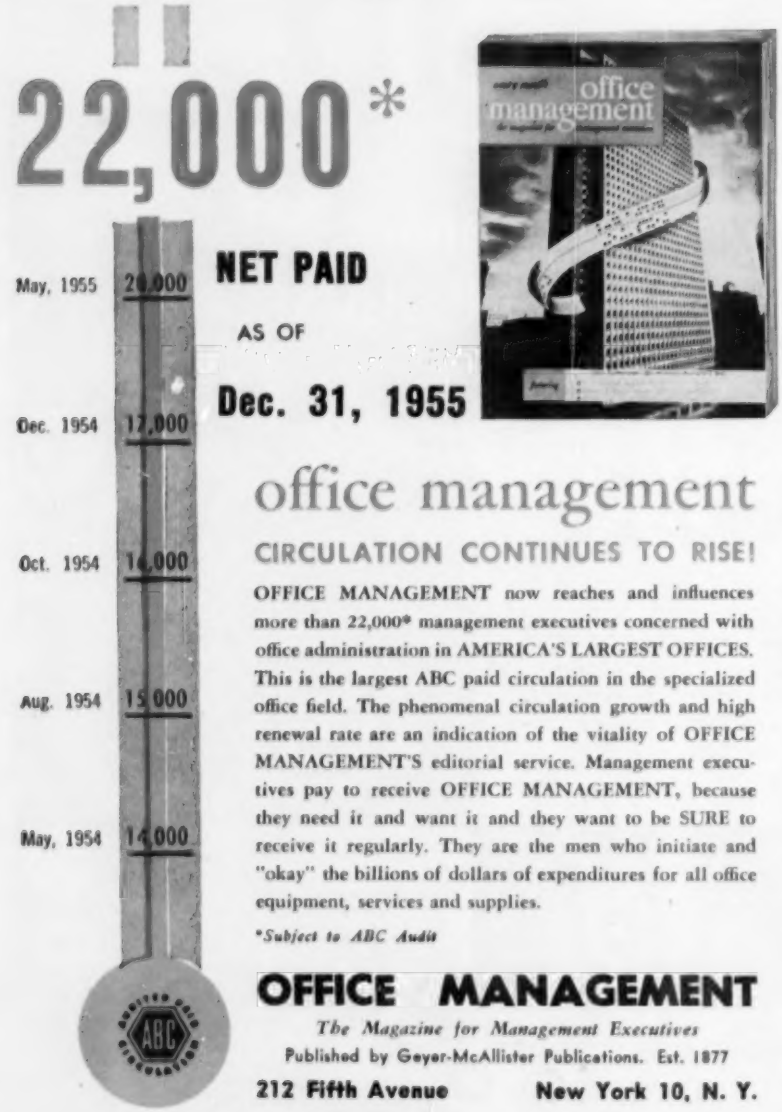
Emerson Radio & Phonograph Corp., 111 *Eighth Ave., New York (AC-W)*

Fasco Industries, Inc., Davis & Toppin Sts., Rochester 2, *N. Y. (F)*

Fedders-Quigan Corp., 5801 *Grand Ave., Maspeth, N. Y. (AC-CA, AC-W)*

Fresh'nd-Aire Co., Div. of Cory

(To page 177)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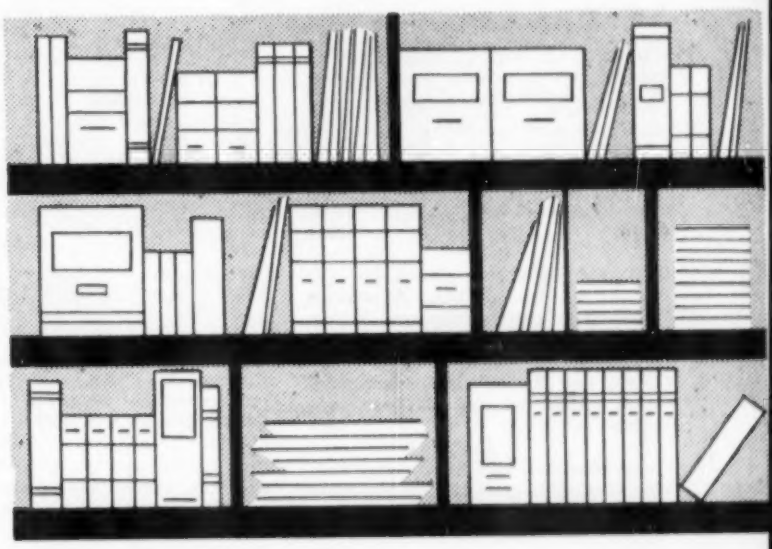
CATALOGS

BOOKLETS, BROCHURES FOR THE OFFICE



Office Furniture

AND OTHER EQUIPMENT

Aetna Steel Products Corp., Arnot-Jamestown Div., 730 Fifth Ave., New York 19. Catalog AF 115 on Office-ettes, Partition-ettes, modular furniture, steel and wood desks. **(1)**

Airkem, Inc., 241 E. 44th St., New York 17. Literature on eliminating odors. **(2)**

All-Steel Equipment Inc., Aurora, Ill. Literature on ASE office furniture. **(3)**

Aluminum Seating Corp., 17 S. Cherry St., Akron 8, Ohio. Catalog CS-4 on "Fine-Rest" aluminum office chairs. **(4)**

American Blower Corp., Detroit 32. Bulletin No. 7214 on fans, with ventilation specifications. **(5)**

Amic Mfg. Co., 21-25 44th Ave., Long Island City, N. Y. Brochure on built-in-wall air conditioning units. **(6)**

Armstrong Cork Co., 4210 Indian Road, Lancaster, Pa. *Quiet at Work*, booklet on Armstrong acoustical materials. **(7)**

Arnolt Corp., Warsaw, Ind. Illustrated brochure describing Climax Club smokers. **(8)**

Art Metal Construction Co., Jamestown, N. Y. Brochure on "New Century" desks. **(9)**

Associated Industrial Designers, P. O. Box 39652, Los Angeles 39. Illustrated circular on "Sort-O-File" paper sorting equipment. **(10)**

Atlas Stencil Files Corp., 16716 Westfield Ave., Cleveland 10. Illustrated pamphlets on Atlas cabinets and hangers. **(11)**

Automatic Electric Co., 1033 W. Van Buren St., Chicago 7. Brochure, *Dial Your Way to Greater Business Success*, on P-A-X telephone intercommunication. **(12)**

Bankers Box Co., 720 S. Dearborn St., Chicago 5. Catalog No. 1125, covering filing and storage equipment, binders, wood shelving. **(13)**

The Bassick Co., 437 Howard Ave., Bridgeport, Conn. Literature on nylon bearings for tilting chair control. **(14)**

Borroughs Mfg. Co., 3002 N. Burdick St., Kalamazoo, Mich. Literature on bookcases, library shelving, storage units and wrap racks. **(15)**

John D. Brush & Co., Inc., 545 West Ave., Rochester 11, N. Y. Folder 35, 12 *Big Reasons You Need a Safe*. **(16)**

Business Efficiency Aids, 8114 N. Lawndale Ave., Skokie, Ill. Catalog No. 4 covering vertical-visible card filing tray using magnetism. **(17)**

Business Machine Products, Inc., 8 Engle St., Englewood, N. J. Brochure on "Silent Sentry" typewriter base. **(18)**

Can-Pro Corp., 19 E. McWilliams St., Fond du Lac, Wis. Folder on "Security" mail bags and other equipment for mailrooms. **(19)**

Carpet Institute, Inc., 350 Fifth Ave., New York 1. Brochure, *Cutting Costs with Carpet* containing information on saving money with carpets. **(20)**

Irwin Casper, Inc., 401 Broadway, New York 13. Literature on office partitions and metal shelves. **(21)**

Cece Steel Products Corp., 5601 W. 26th St., Chicago 50. Literature on office partitions. **(22)**

The Celotex Corp., 120 S. LaSalle St., Chicago. Literature on sound conditioning. **(23)**

Chart-Pak, Inc., 100 Lincoln Ave., Stamford, Conn. Folder, *Visualization Made Easier*, explaining methods for making charts, office layouts, etc. **(24)**

Clarin Mfg. Co., 4640 W. Harrison St., Chicago 44. Catalog describing Clarin steel folding chairs, and combination table and chair. **(25)**

Cole Steel Equipment Co., Inc., 285 Madison Ave., New York. Catalog covering steel desks, files, and cabinets, and aluminum chairs. **(26)**

Connecticut Telephone & Electric Co., 193 Britannia St., Meriden, Conn. Literature on "Direct-A-Call" intercommunication systems. **(27)**

Convoy, Inc., P. O. Station B, Box 216-0, Canton 6, Ohio. Literature on "Chem-Board" storage files. **(28)**

Corbin Wood Products Div., American Hardware Corp., Hornell, N. Y. Catalog, *Speed Your Mail Handling*, describing mailroom equipment and other Corbin wood products. **(29)**

Corry-Jamestown Mfg. Corp., Corry 5, Pa. Illustrated booklet, *All Filing*, describing "Steel Age" files. **(30)**

I. D. Cotterman, 4535 N. Ravenswood Ave., Chicago 40. Circular 53-0 describing Cotterman Tubular Welded Steel Safety Ladders, for vaults, file rooms, etc. **(31)**

Cramer Posture Chair Co., Inc., 1205 Charlotte, Kansas City, Mo. Literature on Cramer posture chairs. **(32)**

D&L Office Furniture Co., 61 W. Hubbard St., Chicago 10. Booklet, *Modular Office Furniture*, illustrating office furniture and partitions. **(33)**

Dage Television Division, Thompson Products, Inc., West 10th St., Michigan City, Ind. Literature on industrial closed circuit television equipment. **(34)**

Day-Brite Lighting Inc., 5474 Bulwer Ave., St. Louis 7. Literature on "Day-Brite" lighting fixtures. **(35)**

Dependable Mfg. Co., Bellevue, Nebraska. Literature on adjustable chairs and stands. **(36)**

Detroit Steel Products Co., 3425 Griffin St., Detroit 11. Literature on "Electrifloor." **(37)**

Dolin Metal Products, Inc., 315 Lexington Ave., Brooklyn 16, N. Y. Literature describing steel transfer files and "mobile storage." **(38)**

Domore Chair Company, Inc., 210 Monger Bldg., Elkhart, Ind. Folder, *How to Keep Fit Without Effort*. **(39)**

E. I. du Pont de Nemours & Co., Fabrics Division, Newburgh, N. Y. *Du Pont "Fabrilite" Vinyl Upholstery Sample Card*, with swatches of material. **(40)**

Ebco Mfg. Co., 265 N. Hamilton Rd., Columbus, Ohio. Booklet, *Oasis Hot 'n Cold Water Coolers*. **(41)**

Egry Register Co., Dayton 2, Ohio. Folder on Egry "Elite Compak" autographic registers. **(42)**

Erie Art Metal Company, Inc., 1602 E. 18th St., Erie, Pa. Literature describing cash boxes, strong boxes, steel waste baskets, sand urns, etc. **(43)**

Executive Furniture Co., 2800 Virginia, Wichita Falls, Texas. Catalog covering walnut furniture for executive offices. **(44)**

Executone, Inc., 415 Lexington Ave., New York 17. Form 276, describing intercommunicating systems. **(45)**

Federal Telephone and Radio Company, 100 Kingsland Rd., Clifton, N. J. Literature on intercommunication systems with remote control and dictation facilities. **(46)**

Feiler Engineering & Mfg. Co., 802 N. Monticello Ave., Skokie, Ill. Brochure on "wireless" intercommunication equipment. **(47)**

The Feldman-Selje Corp., 910 E. Fourth St., Los Angeles 13. Catalog No. 4 on desks, chairs, cases and tables. **(48)**

G R Products, 2417 Eastern Ave., Grand Rapids, Mich. Catalog on sound-absorbing "Soundex" movable partitions and walls. **(49)**

The General Fireproofing Co., Youngstown 1, Ohio. Folder describing GF "Generalaire" desks. **(50)**

The Globe Wernicke Co., 5025 Carthage Ave., Norwood, Cincinnati 12. Literature on filing equipment and systems. **(51)**

Gonco Mfg. Co., 1259 S. La Brea Ave., Los Angeles 19. Literature on "Jac-A-Desk" and "Sted-I-Leg" desk stabilizers. **(52)**

The M. P. Goodkin Co., 889 Broad St., Newark, N. J. Brochure on "Camera Lucikon" model A. **(53)**

Graphic Systems, 55 West 42nd St., New York 36. 24-page illustrated booklet on "Boardmaster Graphic Visual Control Systems." **(54)**

Guide System & Supply Co., Inc., 335 Canal St., New York 13. Catalog No. 551 covering "Transfile" transfer files and other equipment. **(55)**

Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3. Catalog describing fixtures for incandescent, recessed and other lighting. **(56)**

Walter Haertel Co., 2840 Fourth Ave. S., Minneapolis 8. Folder on adjustable deck shelving, suggesting ways to use available space. **(57)**

F. E. Hale Mfg. Co., Herkimer, N. Y. Catalog No. 754 on sectional and solid end bookcases. **(58)**

Hamilton Mfg. Co., Two Rivers 6, Wis. Literature on "Auto-Shift" tables. **(59)**

Hamilton Mfg. Corp., 2525 State St., Columbus, Ind. Catalog descriptive of "Cosco" office chairs and other furniture. **(60)**

Philip Hano Co., Inc., Holyoke, Mass. Folder illustrating and describing autographic registers. **(61)**

Harter Corp., Sturgis, Mich. 28-page catalog in color showing steel office chairs. **(62)**

The E. F. Hauserman Co., 6800 Grant Ave., Cleveland 5. Folder, *How Eight Companies Saved* $595,363, on movable steel office partitions. **(63)**

Herring-Hall Marvin Safe Co., 1550 Grand Blvd., Hamilton, Ohio. Pamphlet, *Fire Resistive Safes with the "Forward Look."* **(64)**

Hush-A-Phone Corp., 65 Madison Ave., New York 16. Booklet on solving telephone problems—privacy, office quiet, etc. **(65)**

Indiana Desk Co., 1201 N. Mill St., Jasper, Ind. Literature on desks. **(66)**

Invincible Metal Furniture Co., Manitowoc, Wis. Booklet on color combinations and arrangements of furnishings in offices. **(67)**

Jasper Desk Co., Sixth & Anderson Sts., Jasper, Ind. Folders covering nine different lines of wood office furniture. **(68)**

Jasper Seating Co., Jasper, Ind. Literature on office chairs. **(69)**

Johns-Manville, 22 E. 40th St., New York 16. Literature describing vinyl floor tile, asbestos movable walls, and sound control. **(70)**

Kellogg Switchboard & Supply Co., 79 W. Monroe St., Chicago. 4-page color folder on dial intercommunication systems. **(71)**

Kelvinator Water Coolers, Columbus 13, Ohio. Booklet, *The Real Answer to the Coffee Break*. **(72)**

The Kent Co., 854 Canal St., Rome, N. Y. Selection guide to floor machines, vacuum cleaners, etc. **(73)**

Kentile, Inc., 58 Second Ave., Brooklyn, N. Y. Literature on floors for offices, stores, etc. **(74)**

Knoll Associates, Inc., 575 Madison Ave., New York 22. Booklet, *Knoll Office Planned Furniture*, on desks, conference tables and chairs. **(75)**

The Kohlhaas Co., 8012 S. Chicago Ave., Chicago 17. Literature on "Vert-A-Sort" alphabetical sorting equipment. **(76)**

Lansdale Products Corp., Box 568, Lansdale, Pa. Folder, *Control is the Modern Way to Business Efficiency*, on control boards. **(77)**

Lassco Products, Inc., 485 Hague St., Rochester. Folder, *Equipment for Bindery Service in the Print Shop*. **(78)**

Leahy Business Archives, Inc., 337 W. 27th St., New York. Literature on records storage equipment (special double-wall containers). **(79)**

The Leopold Company, 914 Osborn St., Burlington, Iowa. Catalog covering wood desks, tables, cabinets. **(80)**

Lightolier, Inc., Jersey City 5, N. J. Brochure, *Lighting with that Lightolier Flair*, on decorative incandescent lighting. **(81)**

Lit-Ning Products Co., 3907 Duquesne Ave., Culver City, Calif. Catalog No. L-11, covering metal desk-top accessories. **(82)**

Loumac Supply Corp., 333 E. 103rd St., New York 29. Catalog on smoking stands, umbrella stands, planters, waste baskets, etc. **(83)**

Lundstrom Laboratories, Inc., P. O. Box 750, Herkimer, N. Y. Bulletin on "Densiwood" splinter-proof and dent-resistant center posts for wood office desks. **(84)**

Macey-Fowler, Inc., 305 E. 63rd St., New York. Literature on executive office furnishings. **(85)**

The Maine Mfg. Co., P. O. Box 532, Nashua, N. H. Brochure OF-10, covering "White Mountain" steel office furniture. **(86)**

Management Control Charts Co., 1731 N. Wells St., Chicago 14. Brochure No. 105 on interchangeable wall charts for controlling management, production and sales activities. **(87)**

Marshall Field & Company, Contract Division, 201 Merchandise Mart, Chicago 54. Brochure on office furniture. Illustrated in color. **(88)**

Martin-Parry Corp., P. O. Box 964, Toledo 1. Literature describing "Metlwal Jr." movable partitions. **(89)**

Mayline Co., Inc., 621 N. Commerce St., Sheboygan, Wis. Catalog No. 8A, *Drafting Room Furniture and Equipment*. **(90)**

McDonald Products Corp., Duk-It Bldg., Buffalo 10. Catalog on complete line of smoking equipment and desk sets. **(91)**

Meilink Steel Safe Co., 1672 Oakwood Ave., Toledo 6, Ohio. Literature describing Meilink safes and "Hercules" insulated steel files. **(92)**

Methods Research Corp., 441 Mosel Ave., Staten Island, N. Y. Folder on "Magne-Trol" control board. **(93)**

The Mills Co., 966 Wayside Rd., Cleveland 10. 68-page catalog on Mills movable walls. **(94)**

The Bert Mills Corporation, P. O. Box 379, St. Charles, Ill. Brochure describing coin operated equipment for hot beverages and soup. **(95)**

The Milwaukee Chair Co., 3022 W. Center St., Milwaukee. Illustrated catalog covering chairs of various types. **(96)**

Mim-E-O Stencil Files Co., 1219-21 W. Chestnut St., Chicago 22. Brochure on "Mim-E-O" stencil, offset, negative, and master files. **(97)**

Mosler Safe Co., 320 Fifth Ave., New York 1. Four-page brochure on "round-the-clock" banking, describing "Century" day & night deposit safes. **(98)**

Muzak Corp., 229 Fourth Ave., New York 3. Brochure, *A New Kind of Efficiency Expert*, on use of music as an aid to work. **(99)**

National Gypsum Co., Buffalo 2. Magazine, *The Decibel*, giving case histories showing uses of acoustical materials. **(100)**

Noble Bracket Co., 3322 Boston Ave., Oakland 2, Calif. Pamphlet, *Telephone Extension Brackets*, illustrating models for various types of telephones. **(101)**

Office Equipment Mfg. Co. Inc., 2206 Summer St., Dallas. Folder on "Permafile" corrugated storage boxes for inactive records. **(102)**

Peerless Steel Equipment Co., Unruh & Hasbrook Sts., Philadelphia 11. Literature on Peerless desks, files, and tables. **(103)**

Pioneer Equipment Sales Co., 234 E. Colorado, Pasadena, Calif. Literature on "Phone Mate" for increasing phone efficiency. **(104)**

Planoramics 631 E. First St., Boston 27. Brochure on "Plan-O-Board" for scheduling, programming, etc. **(106)**

Posting Equipment Corp., 1026 Niagara St., Buffalo 13, N. Y. Catalog No. 55 covering posting trays, stands and indexes. **(107)**

Pres-To-Line Corp. of America, 2339 Cotner Ave., Los Angeles. Literature on Pres-To-Line copy holders. **(108)**

Rauland-Borg Corp., 3515 S. Addison St., Chicago 18. Details on "Amplicall." **(109)**

Remington-Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. Booklet LBV396, *How to Simplify Your Files and Filing Systems*. **(110)**

Royal Metal Mfg. Co., 175 N. Michigan Ave., Chicago 1. Illustrated folder on executive office chairs. **(111)**

Rudd-Melikian, Inc., Hatboro, Pa. Booklet, *Quality is Essential to Complete Coffee Break Control*, describing automatic coffee dispensers. **(112)**

Safeguard Corp., P. O. Box 151, Lansdale, Pa. Literature on ventilators. **(113)**

Security Steel Equipment Corporation, Avenel, N. J. Brochure, *Smart Design in Exciting Color For Your Offices*, describing "Crestline" desks, chairs, etc. **(114)**

Shaw-Walker Co., Muskegon, Mich. 292-page catalog, *Office Guide*, covering complete line of office equipment and supplies. **(115)**

Springer Industries, Inc., 48-01 28th Ave., Long Island City 3, N. Y. Literature on refrigerated bars for offices. **(116)**

The Standard Furniture Co., Herkimer, N. Y. Folder on "Office for Living" plans. **(117)**

The Standard Pressed Steel Co., Jenkintown, Pa. Four-page folder on "Hallowell" adjustable steel shelving. **(118)**

Steelcase, Inc., Grand Rapids, Mich. Brochure, in color, on "convertible" furniture. **(119)**

The Sturgis Posture Chair Co., 154 E. Erie St., Chicago 11. Brochure with pictures and specifications on steel chairs with Fiber Glass bases. **(120)**

Tab Products Co., 57 Post St., San Francisco 4, Calif. Catalog No. 7 on punched card accessory equipment. **(121)**

Tauber Plastics, Inc., 200 Hudson St., New York 13. Literature illustrating and explaining uses for Tauber binding equipment. **(122)**

The Taylor Chair Co., Bedford, Ohio. Eight-page brochure describing line of office chairs. **(123)**

TelAutograph Corp., 1128 Crenshaw Blvd., Los Angeles 19. Brochure on TelAutograph equipment for transmitting handwritten messages by wire. **(124)**

Tiffany Stand Co., Inc., 7350 Forsyth Blvd., St. Louis 5. 1955-56 catalog covering line of office machine stands and large book stands. **(125)**

Tile-Tex Div., The Flintkote Co., 1232 McKinley Ave., Chicago Heights, Ill. Brochure on floor tile, including color charts. **(126)**

United States Plywood Corporation, 55 W. 44th St., New York 36. Booklet, *Weldwood Movable Partitions and Partition Panels*. **(127)**

United States Rubber Co., 1230 Ave. of the Americas, New York. Literature on U. S. "Koylon Foam" cushioning. **(128)**

The Upholstery Leather Group, Inc., 141 East 44th St., New York 17. Booklet, *All About Genuine Upholstery Leather* on the manufacture and care of leather upholstery. **(129)**

Uvalde Rock Asphalt Co., Azrock Products Div., P. O. Box 531, San Antonio 6. Booklet, *Azphlex Vinylized Tile*, on office floor tile, with color charts. **(130)**

Virginia Metal Products, Inc., Orange, Va. Literature on VMP "Mobilwalls" (movable partitions). **(131)**

Visi-Shelf File, Inc., 105 Reade St., New York 13. Catalog describing Visi-Shelf filing system. **(132)**

Vogel-Peterson Co., 1121 W. 37th St., Chicago 9. Catalog 55V, covering coat room and wardrobe racks. **(133)**

Wale Floating Nozzles, 300 Broadway, San Francisco 11. Folder, *Pressman's Paper Feeding Guide*, giving tips on paper feeding. **(134)**

Wassell Organization, Inc., Westport, Conn. Catalog, *Effective Tools for Effective Management*, describing Wassell order desks. **(135)**

Watson Mfg. Co., Inc., Jamestown, N. Y. Booklet, *Speed Record Keeping Without Fatigue* describes "Rol-Dex" units for active records. **(136)**

Wells Chair Corp., Michigan City, Ind. Catalog in color, showing 34 models of Wells "Aristocrat" chairs. **(137)**

The Westcott Co., 4 E. 52nd St., New York 22. Brochure F1, giving information on modular office furniture. **(138)**

The Wheeler Insulated Wire Co., Inc., 150 E. Aurora St., Waterbury 20, Conn. Booklet SA-25A, illustrating and describing Wheeler sound powered intercommunication systems. **(139)**

Wood Office Furniture Institute, 730 11th St., N.W., Washington, D. C. Booklet in color with information about COPS. **(140)**

The Worden Co., Holland, Mich. Catalog describing wood office furniture. **(141)**

Yawman & Erbe Mfg. Co., 1099 Jay St., Rochester, N. Y. Catalog No. 3806, describing extensive line of Y & E steel desks and tables. **(142)**

Zephyr American Corp., 95 Morton St., New York 14. Catalog 4-A, on automatic telephone indexes and rotary card files. **(143)**

Readers wishing to request any of the items listed in this section may do so by using the coupon on page 170. Check the numbers of items desired and forward the coupon to Office Management, 212 Fifth Ave., New York 10, N. Y.

Office Machines

Addo Machine Co., Inc., 145 W. 57th St., New York 19. Literature describing adding machines with "Step-O-Matic" lever for use in multiplication. **(144)**

Addressograph-Multigraph Corp., Cleveland 17. Methods bulletin, *Unit Stock Control and Inventory Procedures.* **(145)**

Air Associates, Inc., 511 Joyce St., Orange, N. J. Brochure, *Electronic Messenger*, on the uses and operation of facsimile communications equipment. **(146)**

R. C. Allen Business Machines, Inc., 686 Front Ave., N.W., Grand Rapids, Mich. Literature on "microflex" impression control to improve typewritten copy for duplication. **(147)**

Alma Office Machines Corp., 440 Fourth Ave., New York 16. Folder on Jolson-Everest "Super-Dial" electric adding machine with automatic multiplication. **(148)**

American Automatic Typewriter Co., 2323 N. Pulaski Rd., Chicago 39. Booklet, *How to Use the Auto-Typist*, explaining 160 ways to use automatic typing. **(149)**

American Dictating Machine Co., Inc., 65 Madison Ave., New York 16. Illustrated catalog on dictating machines and accessories. **(150)**

American Numbering Machine Co., Atlantic & Shepherd Aves., Brooklyn 8, N. Y. *Numberama*, leaflets describing the American line of hand numbering and dating machines. **(151)**

American Photocopy Equipment Co., 1920 W. Peterson Ave., Chicago 26. Brochure describing the "All Purpose Dial-A-Matic Auto-Stat" photocopy machine. **(152)**

Ampro Corporation, 2835 N. Western Ave., Chicago 18. Literature on Ampro two-speed magnetic tape recorders. **(153)**

Charles Bruning Co., Inc., 4700 Montrose Ave., Chicago 41. Literature on "Copyflex" office duplicating process. **(154)**

B. H. Bunn Co., 7605 Vincennes Ave., Chicago 20. Booklet on Bunn tying machines. **(155)**

CADM Corp., 215 Montrose Way, Columbus, Ohio. Literature on rotary collators. **(156)**

Calculagraph Co., 306 Sussex St., Harrison, N. J. Literature on use of Calculagraph equipment for keeping job time records. **(157)**

The Challenge Machinery Co., Grand Haven, Mich. Literature on paper cutters, proof presses, paper drills and punches. **(158)**

Clary Corp., San Gabriel, Calif. Literature on parallel entry and serial entry models of numerical data printers for business and laboratory. **(159)**

Collamatic, State Highway 23, Wayne, N. J. Brochure, *Effortless Collating*, describing electric collators. **(160)**

Columbia Ribbon & Carbon Mfg. Co., Inc., Herbhill Rd., Glen Cove, N. Y. Booklet, *Quality Duplicating with Hectograph*, with tips on hectograph duplicating. **(161)**

Commercial Controls Corp., 1 Leighton Ave., Rochester 2, N. Y. *How Flexowriters Integrate Data Processing*, describing actual systems installations. **(162)**

Copease Corp., 270 Park Ave., New York 17. Brochure explaining photocopy equipment. **(163)**

Copy-Craft, Inc., 105 Chambers St., New York 7. Brochure giving details of "Photorapid" photocopying machine. **(164)**

Cormac Industries, Inc., 80 Fifth Ave., New York 11. Booklet, *The Magic of Photocopy*, desk-type photocopy equipment. **(165)**

Ralph C. Coxhead Corp., 720 Frelinghuysen Ave., Newark 5, N. J. Booklet C-48, describing "Vari-Typer" composing typewriters. **(166)**

Cummins Business Machines, Div. of Cummins-Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40. Leaflet, *Prevention of Fraud & Error*, on use of Cummins perforators. **(167)**

Davidson Corp., 29 Ryerson St., Brooklyn 5, N. Y. 116-page illustrated offset duplicator operation manual, free to all Davidson users on receipt of model and serial numbers. **(168)**

DeJur Amsco Corp., 45-01 Northern Blvd. at 45th St., Long Island City, N. Y. Catalog on "Stenorette" dictating equipment. **(169)**

Dennison Mfg. Co., 300 Howard St., Framingham, Mass. Folder describing "Print-Punch" marking machine in relation to integrated data processing. **(170)**

The Denominator Co., Inc., 261 Broadway, New York 7. Descriptive material, including case histories, on use of manual tabulators for item-sales-analysis. **(171)**

A. B. Dick Co., 5700 Touhy Ave., Chicago 31. Literature on "Azograph" duplicators and their uses. **(172)**

Dictaphone Corporation, 420 Lexington Ave., New York 17. Booklet, *Communication . . . Springboard to Success*, on dictating machines and their uses. **(173)**

Diebold, Inc., Canton, Ohio. Pamphlet, *Modern Record Systems*, describing motorized, visible, and vertical-visible files. **(174)**

Ditto, Inc., 2243 W. Harrison St., Chicago 12. Catalog containing information on liquid and offset duplicating machines and supplies. **(175)**

E. I. Du Pont de Nemours & Co., Photo Products Dept., Wilmington 98, Del. Booklet, *du Pont Photographic Reproduction pa-*

pers, on making photocopies — techniques, formulas, and causes and cures of print defects. **(176)**

Eastman Kodak Co., Rochester 4, N. Y. Booklet F1-106, explaining Verifax office copying equipment and applications. **(177)**

Thomas A. Edison, Inc., Edison Voicewriter Division, 31 Lakeside Ave., West Orange, N. J. *Get Action on the Go!*, covering Edison Voicewriter dictating machines. **(178)**

Facit, Inc., 404 Fourth Ave., New York 16. Brochure FB-24, explaining uses for Facit calculators. **(179)**

Felt & Tarrant Mfg. Co., 1735 N. Paulina St., Chicago 22. Folder, *Dictate Thousands of Letters Without Spending One Cent*, covering modern dictation methods. **(180)**

Friden Calculating Machine Co., Inc., San Leandro, Calif. Literature on calculating machines. **(181)**

General Photo Products Co., Inc., P. O. Box 23, Chatham, N. J. Catalog, *Uses of Photocopy Equipment*, covering photocopy machines and supplies. **(182)**

The Gray Mfg. Co., 521 Fifth Ave., New York 17. Illustrated booklet on the Gray "Audograph V" dictating machine. **(183)**

The Haloid Co., 55-11 Haloid St., Rochester 3, N. Y. Folder, *Proof of Performance*, explaining xerographic duplication and its uses. **(184)**

Harris-Seybold Co., 4510 E. 71st St., Cleveland 5. Folder, *Macey Collating Methods*, describing use of Macey Collator in offices of John Hancock Mutual Life Insurance Co. **(185)**

The Hedman Co., 1158 W. Armitage Ave., Chicago 14. Brochure, on check protectors and signers. **(186)**

The Heyer Corporation, 1850 S. Kostner Ave., Chicago 23. Booklet, *Duplicating Problems Conquered*, covering Heyer "Conqueror" spirit duplicators. **(187)**

Industrial Shredder & Cutter Co., 301 Mill St., Salem, Ohio. Brochure illustrating use of paper shredder for destroying obsolete papers. **(188)**

Insert-O-Matic Corp., 1707 N. 25th Ave., Melrose Park, Ill. Brochure, *Save on All Mailings* describing Insert-O-Matic automatic envelope stuffers. **(189)**

Inserting & Mailing Machine Co., Phillipsburg, N. J. Folder, *How Small Can a Mailer Be?* **(190)**

International Business Machines Corp., 590 Madison Ave., New York 22. *People . . . Products . . . Progress*, describing IBM products. **(191)**

F. G. Ludwig, Inc., Old Saybrook, Conn. Literature on "Contoura-Constat" photocopying equipment. **(192)**

Magnecord, Inc., 1101 S. Kilbourn Ave., Chicago 24. Booklet, 207 *Ways to Use a Tape Recorder*. **(193)**

Magnetic Recording Industries, Ltd., 11 E. 16th St., New York 3. Information on "Voice-Master Challenger" magnetic disk dictation equipment. **(194)**

Marchant Calculators, Inc., 1475 Powell St., Oakland 8, Calif. Booklet, *Index to Modern Figuring by Marchant Methods*, explaining listing of figurework applications for calculating machines. **(195)**

Master Addresser Co., 6500 W. Lake St., Minneapolis 16. Leaflet describing Model 90 addressing equipment and supplies. **(196)**

Michael Lith, Inc., 145 W. 45th St., New York 36. Booklet, *Offset Duplicating*, on special attachments and accessories for duplicating machines and supplies for offset duplicators. **(197)**

Minnesota Mining & Mfg. Co., Small Offset Plates Div., 900 Fauquier Ave., St. Paul, Minn. Booklet on offset plates. **(198)**

Mountain Systems, Inc., 864 Franklin Ave., Thornwood, N. Y. Booklet, *Modac 404*, describing electronic sales and bookkeeping computer used by *Reader's Digest*. **(199)**

Nu Arc Co., Inc., 824 S. Western Ave., Chicago 12. Bulletin 230A-O, containing information about "Rapid Printer" models for making plates. **(200)**

Oerlikon, Business Machines Div., P. O. Box 3049, Asheville, N. C. Booklet, *A New Era in Dictation and Correspondence—20 Important Features and Advantages*. **(201)**

Old Town Corp., 345 Madison Ave., New York 17. Old Town stencil sampler kit. **(202)**

Ozalid, Div. of General Aniline & Film Corp., 60 Ansco Rd., Johnson City, N. Y. Brochure, *This Is Ozalid*, describing Ozalid copying process and sensitized positive aluminum and paper plates. **(203)**

P & H Sales Corp., 5650 N. Western Ave., Chicago 45. Bulletin 54CS covering "Copymaster" dry-diazo office copying equipment. **(204)**

Peerless Photo Products, Shoreham, N. Y. Brochure describing Peerless "Dri-Stat" dry process photocopy equipment and applications. **(205)**

Peirce Dictation Systems, Inc., 5900 N. Northwest Highway, Chicago 31. Folder, *Modern Dictation—For the Modern Man*, on Peirce magnetic belt dictation systems. **(206)**

Pitney-Bowes, Inc., 69 Walnut St., Stamford, Conn. Booklet, *Fight the Concealed Costs*, on postage meters, mailing and business machines. **(207)**

Plus Computing Machines, Inc., 5 Beekman St., New York 38. Catalog A-1-124-100M covering complete line of Plus adding and calculating machines. **(208)**

Recordak Corp., 444 Madison Ave., New York 22. Literature on microfilm equipment and services. **(209)**

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. Folder BSD5B, *Complete Microfilming Service*. **(210)**

Robertson Photo-Mechanix, Inc., 3023 Elston Ave., Chicago 18, Ill. Booklet, *"The 320" Manual of Operation*, illustrating operation of 320 camera for reproduction and duplication. **(211)**

Roll-O-Graphic Corp., 133 Prince St., New York 12. Literature on lithographic and offset duplicating equipment and supplies. **(212)**

Safeguard Corporation, P. O. Box 151, Lansdale, Pa. Brochure describing checkwriters and checksigners. **(213)**

Scribe Corporation, 5022 W. Madison St., Chicago 44. Literature on magnetic dictation equipment, including individual machines and remote systems. **(214)**

Scriptomatic, Inc., 300 N. 11th St., Philadelphia. Literature on high-speed addressing machines and other Scriptomatic equipment. **(215)**

The Shredmaster Corp., 9 E. 40th St., New York 16. Literature on shredding equipment, with illustrations and specifications. **(216)**

Speedliner Co., 4404 Ravenswood Ave., Chicago 34. Booklet, *How to Use Spirit Duplicating in Your Business*. **(217)**

Standard Instrument Corp., Div. of Heat-Timer Corp., 657 Broadway, New York 12. Literature on the "Time Recorder + Totalizer," which monitors machine operation on chronologically marked tape. **(218)**

The Staplex Co., 777 Fifth Ave., Brooklyn 32, N. Y. Literature on Staplex automatic electric stapling machines. **(219)**

Stenafax Div., Times Facsimile Corp., Hotel Biltmore Arcade, New York 17. Brochure, *Stenafax and the new Planofax offset master*, describing electronic facsimile process of making direct image offset paper masters. **(220)**

Stromberg Time Recorder Co., Thomaston, Conn. Bulletin No. 16, describing "Line-A-Matic Time Recorder," used in consecutive printing. **(221)**

Thomas Collators, Inc., 50 Church St., New York 7. Brochure on Thomas Collators. **(222)**

The Todd Co., Inc., Rochester 3, N. Y. Booklet M-242R, describing "Blue-Streak" electric checkwriters and signers. **(223)**

Uarco, Inc., 5000 S. California Ave., Chicago 32. Brochure on form handling equipment with details of devices for separating and delcaving continuous forms. **(224)**

Underwood Corp., Samas Punched Card Div., 1 Park Ave., New York 16. Brochure, *New Economy In Punched Card Accounting*, contains information on integrated data processing. **(225)**

Universal Shredder Co., 2932 Bay Road, Saginaw, Mich. Literature on paper shredders. **(226)**

Victor Adding Machine Co., 3900 N. Rockwell St., Chicago 18. Booklet, *Keys to Better Business*, describing Victor units. **(227)**

Office Supplies and Services

Abco Plastic and Supply Div., Bro-Dart Industries, 59 E. Alpine St., Newark 5, N. J. Literature on "Plasti-Lac" clear acrylic spray for protecting surface of paper and metal work; permanently inked stamp pads, and other products. **(228)**

Acco Products, Inc., Ogdensburg, N. Y. Information on "File and Find" systems. **(229)**

Ace Fastener Corporation, 3415 N. Ashland Ave., Chicago 13. Folder showing complete line of stapling machines, removers, and staples. **(230)**

Aetna Life Insurance Co., Group Division, Hartford, Conn. Booklet, *Paid-Up . . . The Promise of Full and Final Ownership.* **(231)**

G. J. Aigner Co., 426 S. Clinton St., Chicago 7. Circular T-53, picturing and describing typewriter spaced index tabbing. **(232)**

Alliance Rubber Co., 69 W. Washington, Chicago. Literature and free samples of "Arco" open-ring stationery rubber bands. **(233)**

American Credit Indemnity Co. of New York, First National Bank Bldg., Baltimore 2, Md. Booklet, *Credit Insurance, Its History and Functions.* **(234)**

American Lithofold Co., 500 Bittner St., St. Louis 15. Literature on American lithofold forms with samples. **(235)**

American Pad and Paper Co., 88 Winter St., Holyoke, Mass. Literature on desk pads. **(236)**

American Telephone & Telegraph Co., 32 Avenue of the Americas, New York. Literature with suggestions on saving time and money on long distance calls. **(237)**

American Writing Paper Corp., 10 Eagle-A Ave., Holyoke, Mass. Test kit of "easy to erase" papers and master paper for direct print copy machines. **(238)**

Apsco Products, Inc., 9855 W. Pico Blvd., Los Angeles. Leaflet on "Premier" portable pencil sharpener. **(239)**

Arrow Fastener Co., Inc., 1 Junius St., Brooklyn 12, N. Y. Literature on Arrow stapler line. **(240)**

Art Metal Construction Co., Jamestown, N. Y. Booklet on things to be done when moving or rearranging offices. **(241)**

Artloom Carpet Co., Inc., Dellay Div., Allegheny Ave. and Howard St., Philadelphia. Folder on "Duo-Dellay" for cleaning rugs and retarding soiling. **(242)**

Associated Hospital Service, Group Division, 80 Lexington Ave., New York 16. Brochure, *Only the Best for Your Family*, on Blue Cross and Blue Shield hospitalization and medical plans. **(243)**

Atlantic Register Co. & Waltham Salesbook Co., Waltham, Mass. Catalog describing Atlantic registers and continuous forms for electric tabulating and accounting machines. **(244)**

Automation Management, Inc., P. O. Box 217, Westboro, Mass. Reprint, *Organizing the Automation Program.* **(245)**

Avery Adhesive Label Corp., 1616 California Ave., Monrovia, Calif. Folder on Avery "Kum-Kleen" correction tape. **(246)**

The Baltimore Business Forms Co., 3120-56 Frederick Ave., Baltimore 29. Booklet, *Forms for Business*, with case histories on development and use of business forms. **(247)**

Bankers Box Co., 720 S. Dearborn St., Chicago 5. *Manual of Record Storage Practice*, 28-page booklet on record retention, storage, and destruction. **(248)**

Fred Baumgarten, 675 Cooledge Ave., Atlanta 6, Ga. Literature on "Dux Combi" combination tape dispenser and precision pencil sharpener. **(249)**

Beach Publishing Co., 7338 Woodward Ave., Detroit 2. Folder on "Common Sense" expense books and expense sheets. **(250)**

Brownville Paper Co., Brownville, N. Y. Folder of samples of "Sea Foam" bond. **(251)**

Alvah Bushnell Co., 925 Filbert St., Philadelphia. Leaflet on "Vertex" expanding file pockets. **(252)**

Business Men's Assurance Co., B.M.A. Bldg., Kansas City 41, Mo. Literature on the B.M.A. Savings Endowment Plan. **(253)**

The Carter's Ink Co., Cambridge, Mass. Booklet, *Carter's Marking Guide*, with advice on how to mark various surfaces with ink. **(254)**

Cel-U-Dex Corp., 1 Main St., Brooklyn 1, N. Y. Literature on "Bind-X" transparent label holders. **(255)**

Keith Clark, Inc., 130 W. 42nd St., New York 36. Folder describing "Work-A-Day" and "Schedule-A-Date" calendars. **(256)**

Columbia Ribbon & Carbon Mfg. Co., Inc., 4911 Herbhill Rd., Glen Cove, N. Y. Booklet, *Cash In on Your Offset Duplicator's Idle Time.* **(257)**

Compass Instrument & Optical Co., Inc., 104 E. 25th St., New York. 64-page catalog on drawing instruments and supplies. **(258)**

Connecticut General Life Insurance Co., Group Pension Dept., Hartford, Conn. Booklet, *Extra Value Through Better Employee Understanding of the Wages Outside the Pay Envelope.* **(259)**

Cushman & Denison Mfg. Co., Inc., 153 W. 23rd St., New York. Catalog page describing "Ke-Master Key Filing System." **(260)**

Dennison Mfg. Co., 300 Howard St., Framingham, Mass. Literature on Dennison address labels. **(261)**

E. I. du Pont de Nemours & Co., Inc., Grasselli Chemicals Dept., 2539 Nemours Bldg., Wilmington, Del. Booklet, *New Answers from du Pont to the Old Problem of Dirt and Soiling*, on "Ludox." **(262)**

Dupli-Typer Co., 460 Fourth Ave., New York 16. Brochure describing inked ribbon attachments for typewriters and bookkeeping machines. **(263)**

Eagle Pencil Co., 703 E. 13th St., New York 9. Sample pencil free on request. **(264)**

Eastern Corp., Bangor, Maine. Literature on "Atlantic" bond, mimeo, and ledger papers. **(265)**

Ebasco Services, 2 Rector St., New York. Bulletin, *The Inside Story of Outside Help.* **(266)**

Elbe File & Binder Co., Inc., Fall River, Mass. Booklet explaining how and when to use loose-leaf binders. **(267)**

Envelope & Paper Corp., 121 Varick St., New York 13. Folder describing and illustrating envelopes. **(268)**

The Eraser Co., Inc., 1068 S. Clinton St., Syracuse 4, N. Y. Booklet, *The Eraser of 1,000 Uses.* **(269)**

Esleeck Mfg. Co., Turners Falls, Mass. Book of samples of onion skin and manifold papers for letterheads, copies, records, and forms. **(270)**

The Esterbrook Pen Co., Delaware Ave. and Cooper St., Camden, N. J. Literature on Esterbrook desk pen sets. **(271)**

Eureka Specialty Printing Co., 545 Electric St., Scranton, Pa. *Speed Your Mailings*, literature with samples of stickers, gummed labels, etc. **(272)**

Ezyindex Products Corp., 153-13 Northern Blvd., Flushing 54, N. Y. Literature on acetate strip tabs for filing. **(273)**

Eberhard Faber Pencil Co., 37 Greenpoint Ave., Brooklyn 22, N. Y. Catalog on pencils, erasers, and other office supplies. **(274)**

Wm. A. Force & Co., Inc., 216 Nichols Ave., Brooklyn 8, N. Y. Catalog showing hand numbering machines, with charts and tables. **(275)**

Fort Howard Paper Co., Green Bay, Wis. Literature on towel services. **(276)**

Fototype, Inc., 1414 Roscoe St., Chicago 13. Leaflet, *Take the Misery Out of Typing Mistakes,* describing "Snopake" correction fluid. **(277)**

Michael Frumkin, 87-11 35th Ave., Jackson Heights, L. I., N. Y. Folder on "Typex" type cleaning device with interchangeable adhesive reel. **(278)**

General Binding Corp., 812 W. Belmont Ave., Chicago. Manual of plastic and loose-leaf binding. **(279)**

George B. Graff Co., 54 Washburn Ave., Cambridge 40, Mass. Folder on "Graffco" file signals, map tacks, and flags. **(280)**

Guide System & Supply Co., Inc., 335 Canal St., New York 13. Catalog No. 551 on filing supplies. **(55)**

Hammermill Paper Co., 1499 E. Lake Rd., Erie 6, Pa. Book of samples of Hammermill ledger papers. **(281)**

Philip Hano Co., Inc., Holyoke, Mass. Folder, *The Complete Line of Hano Business Systems,* on continuous carbon forms and marginal punched forms, etc. **(61)**

Higgins Ink Co., Inc., 291 Ninth St., Brooklyn 15, N. Y. Literature on inks, pen cleaners, and similar products. **(282)**

R. O. H. Hill, Inc., 270 Lafayette St., New York 12. Brochure, *Letterhead Logic,* free to anyone using over 5,000 letterheads in a year. **(283)**

C. Howard Hunt Pen Co., 7th & State Sts., Camden, N. J. Catalog on pencil sharpeners, pens, etc. **(284)**

Ink Specialties Co., Inc., 519-23 N. Halsted, Chicago 22. *Canode Duplicating Inks,* 42-page catalog on stencil duplicating inks and packaging. **(285)**

S. C. Johnson & Son, Inc., Maintenance Wax Dept., 1525 Howe St., Racine, Wis. Illustrated booklet, *How to Care for Your Floors.* **(286)**

David Kahn, Inc., 1109 Grand Ave., North Bergen, N. J. Literature on "Wearever" pen products. **(287)**

Russell Kelly Office Service, Free Press Bldg., Detroit, Mich. Literature on temporary clerical services provided by "Kelly Girls." **(288)**

Labelon Tape Co., Inc., 450 Atlantic Ave., Rochester 9, N. Y. Folder No. L-6 on "Write on it" tape, with information on its uses. **(289)**

The Lafayette Co., 120 Greenwich St., New York 6. Literature, with samples, on airmail paper and envelopes. **(290)**

Lansdale Products Corp., P. O. Box 568, Lansdale, Pa. Information sheet, *The Uses and Advantages of Clipless Paper Fastening.* **(291)**

Le Febure Corp., Cedar Rapids, Iowa. Literature on systems for short cut bookkeeping. **(292)**

Leahy & Co., Inc., 337 W. 27th St., New York. Pamphlet, *Don't File It—Throw It Away!* on record keeping and paperwork problems. **(293)**

Lee Products Co., 2736 Lyndale Ave., S., Minneapolis. Literature, with free sample on "Sortkwik," a preparation for fingertips to speed handling of papers. **(294)**

Linen Supply Association of America, 22 W. Monroe St., Chicago 3. Booklet, *Your Linen Supply Company,* covering linen and towel service on rental basis. **(295)**

Manpower, Inc., 330 W. Kilbourn, Milwaukee 3, Wis. Booklet, *Get That Job Done,* describing services of temporary employees. **(296)**

Markwell Mfg. Co., Inc., 200 Hudson St., New York 13. Literature on staplers, tackers and staples. **(297)**

Mead Papers, Inc., 118 W. First St., Dayton 2, Ohio. Portfolio, *How to Help Salesmen Sell More,* containing sample sales letters. **(298)**

Joshua Meier Co., Inc., 153 W. 23rd St., New York 11. Booklet, *Under Cover But In Sight,* on use of V.P.D.—Visible Protective, Display products. **(299)**

Metalcraft, Inc., 1619 S. Federal Ave., Mason City, Iowa. Literature on metal tags for furniture and office equipment. **(300)**

Millers Falls Paper Co., Millers Falls, Mass. Booklet, *One Lesson Course in Onion Skin* Papers, with samples of "Ezerase" papers. **(301)**

Mittag & Volger, Inc., 76 Park Ave., Park Ridge, N. J. Literature covering carbon papers and four brands of inked ribbons. **(302)**

Moore Business Forms, Inc., 900 Buffalo Ave., Niagara Falls, N. Y. Literature describing system surveys in offices using Moore business forms. **(303)**

National Blank Book Co., Holyoke, Mass. Consumer catalog, *Better Records,* containing 160 pages of business forms. **(304)**

Nebraska Salesbook Co., 21st at Y St., Lincoln, Nebr. Literature on continuous and snap-out manifold forms and systems, manifold books, and "Kopy-Riter" autographic registers. **(305)**

Neenah Paper Co., Neenah, Wis. Booklet, *What Do You Spend for Each of Your Business Letters?* suggesting economies in letter writing. **(306)**

Nekoosa-Edwards Paper Co., Port Edwards, Wis. Literature on translucent paper for direct-print copy machines. **(307)**

Neva-Clog Products, Inc., 506 Logan St., Bridgeport, Conn. Folder, *Stapling Machines and Staples,* with specifications and suggested uses. **(308)**

New England Mutual Insurance Co., 501 Boylston St., Boston 17. Brochure, *Business Stabilization Plan for Corporations.* **(309)**

New York Life Insurance Co., 51 Madison Ave., New York 10. Brochure, *Major Medical Expense Insurance.* **(310)**

North American Van Lines, Fort Wayne, Ind. Brochure, *So You're Moving,* describing North American moving service. **(311)**

Office Products, Inc., 9920 Freeland Ave., Detroit. Literature on "Perma-Stik" self-adhesive labels. **(312)**

Outlook Envelope Co., 1001 W. Washington, Chicago. Booklet, *Which Envelope Would Help You Most?* describing various styles of envelopes. **(313)**

Parsons Paper Co., Holyoke, Mass. Booklet, *How to Get What You Need in Record-Keeping Papers and Index Cards.* **(314)**

Paterson Parchment Paper Co., Bristol, Pa. Folio of samples of paper. **(315)**

Plastic Binding Corp., 732 Sherman St., Chicago 5. Brochure bound with "Plastico" containing details on Plastico bindings. **(316)**

Quality Park Envelope Co., 450 N. Syndicate St., St. Paul 4. Literature on envelopes for every business need. **(317)**

Remington Rand, Div. of Sperry-Rand Corp., 315 Fourth Ave., New York 10. Folder X1615, *Your Records—How to Cut Their Cost.* **(318)**

The Reynolds & Reynolds Co., 800 Germantown Ave., Dayton 7, Ohio. Literature on how to reduce overhead costs in office procedures. **(319)**

Rochester Ribbon & Carbon Co., Inc., 100 Anderson Ave., Rochester 7, N. Y. Literature, with samples of "Polycar" plastic typewriter ribbons. **(320)**

Royal Typewriter Co., 2 Park Ave., New York. Literature on "Roytype" supplies. **(321)**

S-K Forms Company, 1619 Walnut St., Philadelphia 3. Literature on payroll forms and systems, and accounting supplies. **(322)**

Safeguard Corp., P. O. Box 151, Lansdale, Pa. Literature on payroll and disbursement systems and single entry posting. **(323)**

Sanford Ink Co., 2740 Washington Blvd., Bellwood, Ill. Catalog, giving illustrations and descriptions of inks, erasers, adhesives, type cleaner, etc. **(324)**

Scott Paper Co., Scott Washroom Advisory Service, Chester, Pa. Literature on "Planned Poster Program," suggesting ways to promote washroom cleanliness. **(325)**

Sengbusch Self-Closing Inkstand Co., 2222 W. Clybourn St., Milwaukee 3. Catalog No. 47, *Office Essentials of Distinction,* covering entire Sengbusch line. **(326)**

Shaw-Walker Co., Muskegon, Mich. *Office Guide.* 292-page catalog on office equipment, supplies, etc. **(115)**

The C. E. Sheppard Co., 44-03 21st St., Long Island City 1, N. Y. Catalog A, describing pegboard accounting systems. **(327)**

The Smead Mfg. Co., Inc., 309-311 Second St., Hastings, Minn. Literature on Smead line of filing systems, supplies, etc. **(328)**

Charles C. Smith, Inc., Exeter, Nebr. Literature on file signals, indexes, etc. **(329)**

The Standard Register Co., Dayton 1, Ohio. Brochure No. 2112, describing business forms and form-flow devices to simplify paperwork. **(330)**

Sten-C-Labl, Inc., 2285 University Ave., St. Paul 14. Brochure on Sten-C-Labl, multiple shipment addressing systems. **(331)**

H. M. Storms Co., Storms Bldg., Brooklyn 38, N. Y. Catalog listing many carbon paper and ribbon items. **(332)**

Sugar Beet Products Co., Saginaw 52, Mich. Literature on the new SBS-60 cream deodorant soap. **(333)**

Swan Pencil Co., Inc., 221-225 Fourth Ave., New York 3. Catalog No. 400, covering all kinds of wooden pencils. **(334)**

Ticonderoga Pencil Sales Div., The Joseph Dixon Crucible Co., 167 Wayne St., Jersey City, N. J. Literature on Ticonderoga pencils. **(335)**

The Todd Co., Inc., Rochester 3, N. Y. Folder describing protective features of "Protod-Greenbac" checks. **(336)**

Traveletter Corp., Greenwich, Conn. Brochure on Traveletters and their use by traveling men. **(337)**

Alfred Allen Watts Co., Inc., Allwood, Clifton, N. J. Brochure, *Fifty-Five Ways to Cut Cost and Increase Office Efficiency with Prefabricated Carbon Interleaved Snap-Apart Forms.* **(338)**

Weber Addressing Machine Co., 200 W. Central Rd., Mount Prospect, Ill. Literature on Weber "Tab-On" system for simplifying shipping paper work. **(339)**

Weldon Roberts Rubber Co., 351 Sixth Ave., Newark 7, N. J. Literature on Weldon Roberts erasers of various types. **(340)**

Wellington Sears Co., Fairfax Dept., 65 Worth St., New York 13. Booklet, *All Hands Go for Clean Cotton Towels,* on office and plant towel service. **(341)**

Western Union Telegraph Co., Facsimile & Private Wire Services Div., 60 Hudson St., New York 13. Booklet, *What You Should Know About Western Union Private Wire Services.* **(342)**

Byron Weston Co., Dalton, Mass. Booklet containing samples of Weston bond papers. **(343)**

Wilson Jones Co., 209 S. Jefferson St., Chicago 6. Catalog No. 154, describing loose leaf and record keeping products, staplers, diaries, and calendars. **(344)**

Yawman & Erbe Mfg. Co., 1099 Jay St., Rochester, N. Y. Catalog No. 3704 on Y&E filing systems and supplies. **(345)**

Miscellaneous

Dictaphone Corporation, 420 Lexington Ave., New York 17. Handbook, *Letter Perfect,* containing 88 pages of helpful suggestions for secretaries. **(346)**

Eaton Paper Corp., Pittsfield, Mass. Handbook, *The Perfect Secretary,* on office behavior and "tricks of the trade." (10c per copy.) **(347)**

Alexander Hamilton Institute, 71 W. 23rd St., New York 10. Booklet, *Forging Ahead in Business,* containing 48 pages of suggestions for success. **(348)**

Marble Institute of America, 108 Forster Ave., Mt. Vernon, N. Y. Brochure, *Proof that Marble Costs Less.* **(349)**

L. & C. Mayers Co., Inc., 516 W. 34th St., New York. Booklet on "Choose-it-Yourself" plan for selecting business gifts. **(350)**

McGraw-Hill Book Co., Text-Film Dept., 330 W. 42nd St., New York 36. Catalog describing films for organization and management of industry and business. **(351)**

G. & C. Merriam Co., Springfield, Mass. Booklet, *Where Could She Be?,* giving advice on placement of dictionaries in an office. **(352)**

P. O. Moore, Inc., 300 Fourth Ave., New York 10. Catalog No. 24, suggesting how to prevent loss of keys. **(353)**

If you wish any of the items listed in this section, you may request them by using this coupon. The numbers on the coupon correspond to the numbers of the items in the preceding list. Merely check the numbers of the items you wish and forward the coupon to Office Management.

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Address list for national management organizations

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270 Madison Ave., New York 16.
American Institute of Management
125 E. 38th St., New York 16.
American Management Association
1515 Broadway, Times Square, New York, N. Y.
Controllers Institute of America
2 Park Ave., New York 16.
Industrial Management Society
35 East Wacker Drive, Chicago 1.
Institute of Management Sciences
Mt. Royal & Guilford Aves., Baltimore 2.
Insurance Accounting and Statistical Association
President: James B. Clancy, c/o Royal Liverpool Insurance Group, 150 William St., New York.
National Association of Cost Accountants
505 Park Ave., New York 22.
National Machine Accountants Association
President: Robert O. Cross
c/o Southern California Edison Co., P. O. Box 351, Los Angeles 53.
National Microfilm Association
19 Lafayette Ave., Hingham, Mass.
National Office Management Association
132 W. Chelten Ave., Philadelphia 44.
National Records Management Council, Inc.
555 Fifth Ave., New York 17.
Operations Research Institute, Inc.
41 Fifth Ave., New York 3, or P. O. Box 487, Princeton, N. J.
Railway Systems & Procedures Association
c/o W. A. McClintic, C & O Railway, 6136 General Motors Bldg., Detroit, Mich.
Record Controls, Inc.,
209 S. LaSalle, Chicago.
Society for Advancement of Management, Inc.
74 Fifth Ave., New York.
Systems & Procedures Association of America
P. O. Box 96, Madison Square Station, New York 10.

Personnel—

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policy through the foreseeable future.

In the meantime, the general trend for all worker benefits continues upward. According to the latest salary report from the National Office Management Association, salaries in 24 selected clerical categories showed an average increase of 58 per cent from January, 1947 to September of this past year. The only year during the period in which clerical salaries showed a sharp drop in the *rate* of increase was in the mildly recessive year, 1954, but even then the general trend was upward. The figures were based on NOMA surveys taken in more than 5,000 offices in 105 cities in the United States and Canada.

These figures reflect the continuing shortage of qualified employees, just as does the rivalry between offices to outdo each other in offering benefits to employees.

Solutions are available

But the continuing shortage is not being offset in as many companies as it could be by unorthodox and imaginative measures. The use of part-time workers is producing good results for companies which have tried it—but few have tried it. Here is a quick and definitive answer to the problem posed by early marriage of women office workers, who leave the job when they start to raise a family. A large pool of young mothers with good clerical skills is available for the metropolitan company that will employ them on a schedule that fits within their children's school hours. Some complications are met with in the form of records, additional bookkeeping burden, etc., but this group, by and large, is apt to be steadier in its employment than single girls or married women without children who are free to move from company to company. The part-time workers, because of the very fact that so few companies will take on the extra paperwork burden involved in hiring them, are much more apt to stay with the job when they get it.

The same shortsightedness is handicapping offices in hiring older employees, and here it is a double burden, hitting any given office both in terms of the total pool of labor available and the chances of getting the best of the young labor market and holding on to it.

A man or woman over thirty or thirty-five in a clerical position is often reluctant to leave his present job, even though it is a dead end in the present company, for the very good reason that his age may be a handicap in finding another job. If offices relaxed this policy—an anachronism in a tight labor market—it would immediately expand the market itself by calling back into service many married women whose children are growing up and who are available, but who do not even bother looking for jobs now. It would simultaneously free older office workers holding down dead end present jobs, and make it worth while for them to try to find positions in another company where they would have greater opportunity. This in turn would "unfreeze" more relatively high-level jobs within their own company and the possibility of advancement—even in this age when security and long vacations often seem the only things prospective employees care about—is still a stimulus to the best type of young, beginning clerical worker.

The companies which have exploited these two possibilities—the use of part-time workers, and the lowering of the barriers against older clerical workers, have reported excellent results from the system. Yet the custom is still the exception rather than the rule, even as office executives weep on each other's shoulders about "the personnel problem".

A growing realization of some of these problems characterized 1955, even though efforts to find solutions were spotty and uncertain. The fact that solutions must be found and found rapidly in the fast moving complex of factors that is today's office suggets that 1956 may show progress as great in the improvement of personnel administration functions as the past year brought by clarifying the actual meaning and significance of office automation.

Personnel direction—

(*From page* 26)

you believe that the role and influence of personnel has passed its zenith, is on the decline, and has no right to be considered a major managerial function requiring the services of a senior exectuive. The leading proponent of this thesis is probably Peter Drucker (*The Practice of Management,* Harper, 1954). If I interpret this well-known writer, lecturer, consultant and teacher correctly, he is attacking the profession and career you and I have chosen to follow. If he is right, and this is a

crucial point in the development of the personnel function, then we owe a debt of gratitude to our critic. If he is right, then we had better re-examine our objectives; proceed in some direction other than the present one; divide what is left of the personnel function among the departments recommended by our critic; and leave the rest to the consultants who will no doubt willingly continue to serve as needed on a fee basis, Again, should this thesis be valid, and should we see the logic of leaving the personnel field, most of us would be placed in a rather unfavorable position, since the profession to which we have dedicated ourselves (unlike that of the management consultant) does not readily lend itself to translating our skills toward some equally lucrative management function.

Mr. Drucker would have you know there is considerable activity going on in the personnel field. There is much research and the topic always secures a place on the agenda at management conventions. Yet little, except refinements, has been added to the area since it first won its place as an integral component of scientific management over thirty years ago. Personnel men are pictured as intuitively sensing that we are making a contribution, but that we just cannot pinpoint it; we are accused of always complaining about our low status in the scale of authority, and continually searching for imaginative gimmicks with which to impress management.

Here I am prompted to compare my own experience with formal, professional personnel groups. The evidence is corroborative. Too often, the men of professional stature rarely take an active role in the associations. The clubs are supported by a few idealistic souls and the membership consists largely of the middle echelon of personnel assistants, men and women who are performing the day-to-day operational duties in the personnel departments, but who rarely have anything to say about personnel policy. They need the top level to guide them, but, unfortunately, their bosses rarely attend. On two occasions I was exposed to the problem of arranging for classes to be given under club sponsorship for its practicing members. In the first instance, the club committee insisted that regardless of teaching ability, it wanted an older gentleman with proper titles. In the second instance I tried unsuccessfully to insert at least one set of weekly conferences on what I consider to be a basic personnel need, namely, the techniques of justifying an enriched personnel program to one's own management. There was a good deal of squirming and rationalizing as to whether the successful confreres would divulge their rare skills. We skillfully skirted the issue by settling on gimmick courses in the areas of salary administration, merit rating and trends in labor law.

Is our emphasis correct?

Is it any wonder we are accused of being merely a catch-all for all the odds and ends for which top management cannot find a logical spot on the organization chart? Are most of us performing nothing more than such minor functions as filing personnel folders, housekeeping, limited social work, and fighting a rear guard action against the advent of unions? Who was the first personnel man in history to come up with the gimmick of changing the name of file clerk to records clerk? Is this typical of the scale of our thinking? We have accumulated a number of necessary but unpleasant chores such as pensions, salary administration, safety, and suggestion systems. Often these carry no weight or influence; consequently, no one else wants to administer them. Drucker observes that there is no kinship of skills here, and that all in all this hardly adds up to a major managerial function. He adds that since we have little or no control over supervisors and since we work under the misconception that the only reason people work is to gain satisfactions outside the job, we tend to stress the outside satisfactions—pensions, hobbies, community relations, etc. The suggestion is that we tend to spend our time and energy in those areas over which we have a semblance of control. So, for example, although to hear and believe us at conventions the emphasis is placed on training managers to supervise people properly, nonetheless, ninety percent of our personnel budgets are slated for the more pedestrian activities of the personnel department.

We read these criticisms and we bristle. We search for all sorts of rationalizations. Sure, the approach is on the sensational side, it is negativistic, perhaps even destructive. Regardless of the tenor of the approach, it is imperative that our profession stop this daily piling of lumber and take time out to think in terms of objectives, goals, justifying our existence, and establishing controls which will ascribe credit and blame where they rightly belong.

The corporation with the largest numbers assigned to their personnel departments are not necessarily the best managed or the most enlightened. Ideally, if each division and department in a company did its job well, the personnel department should shrink to a very small staff function. But the most skilled personnel officer cannot work as a model of scientific efficiency if he is an oasis surrounded by barren, arid areas of mismanagement. Either he will be bent to the will of the inept, in which case he begins to assume operational responsibilities in order to fill the void, and thus begins to grow to unnecessary size, or, he buries his head in day-to-day detail, reluctant to look out the window for a minute and think, for fear he will begin to admit his compromising of principles.

A prime requisite-courage

I have seen all kinds of check-lists enumerating the virtues of a good personnel administrator. Not one mentions *courage*. Rather than fight for a personnel function which will spell out our responsibility and authority clearly, we gripe about existing conditions. We tend to assume that all managements are old-fashioned and dollar-conscious and tell ourselves that we cannot change human nature. Instead of huddling together and worrying as to "Why don't they like us, we are so decent and honest", we had better reconcile ourselves to the fact that managements were not born with a blind faith in all personnel men and in all programs. However, they can be sold. Personnel men are salesmen and our products are ideas. Our customers are on three levels; employees, department heads, and management. Each comes with a different viewpoint and must be approached differently. Perhaps the most sales resistance is generally put up by management. After all, the boss is usually using his own money, or at least is most directly accountable for what he

buys and how much he spends. Before we try to sell, we should know not only the product but the buyer as well. We may be willing to buy on blind faith, but the boss is more amenable to "fact".

This business is not for the overly sensitive. We are selling intangible ideas—the most difficult of products. If we are going to pout over a rejection and take it without pursuing the matter further, not only will we find it more difficult to sell the next idea, but more to the point, by submitting too readily, we are not playing the role for which management is paying us. I maintain there is not sufficient backbone and fight in our personnel salesmen. I am not suggesting that we start talking *back* to management, but I do urge that it is time to speak *up* to the boss. Yes, this is more easily said than done. How about the payments due on the car, and the mortgage, and the scarcity of jobs, you say. I know of no answer except that some of this is basic to the job. We are of little value to the company unless we are reasonably successful in selling our program. We cannot expect to succeed with every effort; but, by the same token, we should demonstrate some semblance of a major league batting average. Suppose the customer just won't buy no matter how often you speak up? Then start looking for another job. Either you are a poor salesman, or the customer hasn't suffered enough to recognize that he has a real need for your product. You and I do not have to convince ourselves of the purity of our motives, nor of the decency and urgency of our programs. There is nothing unethical, however, about using some good sales techniques and some bright ribbon and paper for packaging.

Observe that it would be relatively easy to write a job description or to list the functions of any top executive or staff job, but this is not true for the personnel function. I submit that no two personnel directors' jobs are alike. Your job in personnel is what you make it. You can be a record keeper, a hatchet man for a boss who is too kind hearted to do his own firing, a gimmick man, or you can make the personnel function the most creative, exciting, and satisfying experience of your life. If it is a new assignment, there isn't a company president in existence who doesn't think he is an expert in your job. This is more reason for the both of you to determine the areas of your individual responsibility. Agree on the rules and procedures before you start and once you get going insist on your right to do your job. Either maintain your dignity and integrity or resign yourself to a career of compromise, frustration, and innocuous grumbling.

Apparently many of us sense the need for taking the initiative. I have made it a practice to study casually the desk tops of my personnel friends. Again and again I have observed little sermons of encouragement. The little card I see most often reads something like this: "God grant us the serenity to accept the things we cannot change; the courage to change the things we can, and the wisdom to know the difference." Allow me to suggest an additional thought which comes from an advertisement used recently by a leading national news magazine: "It is not how much we get onto our pages but how many ideas go from the pages to the minds of our readers."

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Forms control—

(*From page* 33)

stantly be isolated for the type of reports studied described above. Needless to say these forms under the function "to report" will relate to a wide variety of subjects of operation.

The functional index also provides a means of coding forms in relation to subjects, operations, and functions in such a way that they make possible direct comparison in clerical operations for the measurement of efficiency and office costs.

The building of the functional index is a long and time-consuming operation, not to be undertaken lightly by untrained personnel. It requires a dictionary of standard terminology (in few places is there such confusion of terminology as in forms) in order that the classification can outlast personnel changes and withstand the ravages of new ideas and concepts every time someone new comes on the forms control job.

The successful creation of forms control files brings into being information vital to any office cost control program as well as to the physical and functional control of the forms themselves.

Some of the important information gained from the building of a functional index is:

a. A positive knowledge of how many forms and how many pieces of paper there are in the company, together with who uses them and how many are used annually.

b. Instant knowledge of how many different forms there are in different locations doing the same thing or serving the same purpose.

c. A tabulation of all pieces of paper for a workload study on printing equipment and office duplicating machines control.

d. A tabulation of forms and pieces of paper by division, department, or other work unit, revealing the areas of heavy paperwork loads.

e. The tabulation of forms and pieces of paper in relation to the possible application of electronic tabulators and automation in the office.

Any attempt whatever to control office costs or office operations will of necessity run into the problem of control over the forms themselves. It makes no difference whether the approach is through a preplanning study for electronics, or a procedural simplification program, a records retention program or a work measurement or work simplification program. It is inevitable that the forms themselves become the raw material of the study or program.

Since this is true it is to the obvious advantage of any such study to have a control over the company's forms already set up, in order that the personnel making the further study can immediately lay their hands on all of the paper concerned with the area under study.

Forms control will, of course, come about whether it is done before, during or after the other studies since no such study can be made without working with the pieces of paper. If the forms control program is not established prior to the more extended program it will of necessity come about as a by-product of the other work.

The unfortunate part of this latter situation is that no one ever knows when it is complete or to what extent it has covered all of the company's forms, and as a matter of fact it will probably never cover all of the company's forms since many small usage forms do not become uncovered in the average procedural study of the company's clerical operations.

The only really sensible approach to an office cost control program is to undertake the various parts simultaneously, that is to say forms control, procedures control, clerical cost measurement and records control, with work simplification occurring as a natural by-product of the study of all these factors.

Any company undertaking such a coordinated program will attain the maximum results in its effort to control paper work and clerical costs in the company.

Systems design—

(*From page* 38)

uring production rate per hour for any given operation when machines are primarily responsible for that production. In the machine research phase, the planner has carefully checked machine capabilities; he knows exactly what each of the machines he has selected in his final system design is capable of producing per hour.

But personnel, as always, are a variable factor. Here is where the planner's knowledge, judgment—and a high degree of caution as well—are required in predicting costs under the new system.

If the projected operation under the new system is very similar to some standard operation under the old; if particular forms used in a given operation still require typed entry of information, but the forms themselves are shorter than those used in the corresponding operation under the old system, for instance, there is no great difficulty. The planner consults his volume and time figures for the particular work group which carried the operation under the old system, and will carry it under the new, and compares the amount of typed information required for completion of the form under the old system, with the lesser amount required under the new. By simple mathematics, he estimates with fair accuracy how much increased production of units—forms in this case—he may expect from this group under the new system.

New operations: greater problems

When it is a matter of establishing rate per hour for workers involved in a totally new and unfamiliar operation, however, the problem is obviously more complicated. Here, the planner has recourse to two different solutions. He may run tests of the new operation or work sequence with the people who will be performing it to find hourly production figures for the group. Alternatively he may resort to standard averages available for the particular operation. Such standards are derived from national norms that have been established.

After these computations have been completed for each operation scheduled under the new system, the planner has available the probable worker and machine output per hour for each operation under the new system. This rate per hour (based on machine rate and worker rate) is divided into the annual volume figure for the corresponding operation during the base year selected. In this way, the planner establishes the number of man hours and the number of machine hours needed to perform the new operation in an average year.

With the completion of such figures for each operation scheduled under the new system, the planner can at last begin to see with a fair degree of precision exactly what his new system is likely to cost. For each department in the office, he begins to work out new system costs on the basis of the operation carried in that department, and the average departmental wage (based on number of employees in that department and total departmental payroll for the base year.)

Adding together the man hours he has worked out as necessary to carry the department's operations under the new system, he lists these under "Direct Hours" on a cost sheet. He adds a percentage figure for indirect operations, which will vary with each department according to the amount of variable and non-repetitive work (which is not covered on the flow charts) which that department is likely to encounter in its daily operations. This figure for "indirect operations" is deliberately made generous to keep the entire cost picture on the safe side. For departments with a high degree of non-repetitive work, it may run as high as 200 per cent of the figure allotted to "Direct Hours."

Incidentals must be included

Next, the planner adds a percentage figure for "Learner's Hours," to cover the production lag that occurs whenever new workers are being trained. Here again, the planner's good judgment is his best guide. Obviously, however, departments with fairly involved and complicated procedures are given a much more generous allotment for "Learner's Hours" than are those with relatively simple work patterns.

A further percentage figure is added to cover paid absences and vacation periods. This figure of course is easily computed on the basis of past company averages.

The last figure added covers supervisory hours, according to the ratio of supervisors to basic clerical employees implied under the new system requirements.

The total of all these figures for each department represents the approximate number of hours required within that department to process under the new system a volume of work equal to that done during the base year. This figure, multiplied by the average departmental wage, gives the total estimated payroll cost for the department under the new system.

When these payroll figures have been added for all departments, a substantial percentage is added to the total cost as a safety factor, and a further figure for "Fringe Benefits". The latter figure will vary with the company's policy on these perimeter payments. The final total represents the planner's best possible estimate of the total labor costs under his proposed new system.

This total figure shows one possible area of savings—the payroll factor. It is by no means a complete picture, however. Some new machinery will probably be called for under the new system, and the cost of such machinery must be accommodated in the total cost picture. Conversion to the new system will take time and money. New supplies must be laid in, new forms ordered. Some old machinery may have to be written off. All these factors must also be taken into account.

Fortunately, all these latter factors can be predicted with a high degree of precision. But they must not be neglected. For a system may show a rosy picture on payroll savings, but demand so heavy an investment in new equipment to achieve that savings that the cost of the equipment cannot be recovered out of savings for a number of years.

If the savings, after the system is in full operation, promise to compensate for all the initial capital investment in a period of two to four years, generally the system will be a good buy, provided it meets all of management's requirements adequately.

If four to eight years will be required before payroll savings equal initial costs, then the cost picture is moving into the marginal area; management should weigh the whole project very carefully before going ahead and authorizing system conversion.

If more than eight years will be required before savings overcome capital investment, the system is a bad project when considered strictly from a financial viewpoint. Other long range considerations may make it worth buying; economy of operations does not.

This is system costing carried out scrupulously. Management should always make sure that each of these factors has been considered, when any proposed system cost figures are presented. That is their responsibility to themselves and their company, just as it is the planner's responsibility to make each of the figures presented to management as accurate and as cautious as possible.

The figures will never be exact. But the area of savings they show should be fairly close to the actual savings achieved if the system is put into effect. This method of costing will show management approximately what savings it might expect if it adopts the planner's proposed system, and how soon those savings might reasonably be expected to overcome the capital costs of instituting the system. It presents a complete picture to management, and an honest picture. Management is thus faced with a business proposition, not a pig in a poke.

This business proposition is embodied by a good planner in a final management report, which becomes the complete outline by which management decides whether or not the proposed system is something it should buy or something it should table.

A good management report should be a complete picture of everything that has been done in the entire process of system planning, and of all that may be expected (both good and bad) from the proposed new system.

It should include the major savings that might be achieved under the system as well as the major costs that will be necessary to put the system into operation.

Any organizational changes that might be necessary in departmental responsibilities should be outlined.

A recapitulation of the objectives set up by management at the very beginning of systems planning should be included, with a demonstration of just how closely the proposed system meets each of the objectives.

All cost comparisons prepared by the planner for the expenses of the new system as against the old should be included, with all the figures on which the planner has based his estimated new system costs.

Finally, there should be attached a general conversion and installation schedule for the new system if it is adopted by management so that the changeover can be accomplished as smoothly, as economically, and with as little interruption in the company's normal flow of work as possible.

The management report should be accompanied by a report which includes the planner's finished flow charts and descriptive text showing all the operations under his proposed new system, as well as an exhibit report which shows samples of the forms the new system will require, and pictures and specifications for all the new machines called for under the new system.

This is the management package—a complete unit which should answer all conceivable management questions. As such it presents management with a clear picture, and a relatively simple proposition. Management now is deciding on as tangible a purchase as a plan can ever be. It has a fairly accurate idea of what it is buying, if it insures that each of the foregoing steps has been taken by the planner. It can judge whether it wants to buy the system on a fairly clear anticipation of exactly what the system will achieve, and how much it will cost in the long run to achieve it.

As such, the management decision about changeover to a new system is brought down from the realm of intuition and inspired guessing to a common sense proposition—a common sense proposition which any good businessman can judge on its merits, just as he can judge the acquisition of a piece of property for his company.

System planning is a job for experts, but there is no reason why the results of the expert's planning cannot be put in a form clearly understandable to any intelligent executive. There should be no "By guess and by God" in system design; the fact that there is so much of it merely underlines the fact that like any other relatively new field, system plannings has its charatan fringe.

No sensible businessman would construct a plant without exact cost figures and exact reasons for believing that the plant would be an asset to his company. There is no reason why he should buy system or machine innovations without equally precise assurances that they make sense.

Tools of the Office

(*Continued from page* 162)

Corp., 221 N. LaSalle St., Chicago 1. (AC-W)

Friedrich Refrigerators, Inc., 1117 E. Commerce St., San Antonio 3. (AC-W)

Frigid, Inc., 128-168 32nd St., Brooklyn 32, N. Y. (AC-W, F)

Frigidaire. See: *General Motors Corp.*

General Electric Co., Air Conditioning Div., Bloomfield, N. J. (AC—ceiling mounted, AC-W)

General Motors Corp., Frigidaire Div., 300 Taylor St., Dayton 1, Ohio. (AC-W)

Gibson Refrigerator Co., 515 Williams St., Greenville, Mich. (AC-C, AC-W)

The A. C. Gilbert Co., Erector Square, New Haven 6, Conn. (F)

Goodwill Mfg. Co., 1215 S. Laramie, Cicero, Ill. (F)

Griffon Productions, 4 Hathaway Rd., Bronxville, N. Y. (F)

Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3. (F)

Hotpoint Co., 5600 W. Taylor St., Chicago, Ill. (AC-W)

Hunter Fan & Ventilating Co. Inc., 400 S. Front St., Memphis 2, Tenn. (AC-W, F)

Ilg Electric Ventilating Co., 2850 N. Pulaski, Chicago 14. (F)

International Harvester Co., 180 N. Michigan Ave., Chicago. (AC-W)

Kelvinator Div., American Motors Corp., 14250 Plymouth Rd., Detroit. (AC-W)

King Refrigeration Co., La Crescent, Minn. (NI)

Kisco Co., Inc., 2400-40 DeKalb, St. Louis. (F)

The Lau Blower Co., Dayton 2, Ohio. (F)

LeJohn Mfg. Co., 111 22nd St., Huntington, W. Va. (F)

Manning-Bowman Div., McGraw Electric Co., Elgin, Ill. (F)

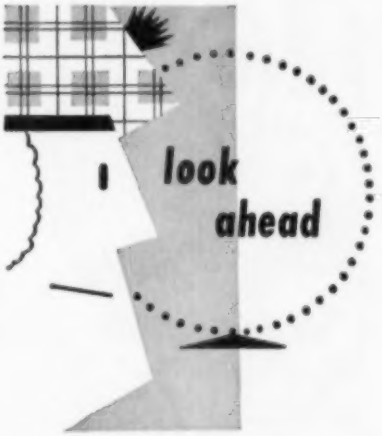
Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago 14. (AC-W)

Perfection Industries, Div. of Hupp Corp., 7609 Platt Ave., Cleveland 4, Ohio. (AC-CA, AC-CW)

Philco Corp., Tioga & C Sts., Philadelphia 34. (AC-CA, AC-CW, AC-W)

Precision Equipment Co., 3100 Carroll Ave., Chicago. (F)

Quiet Heet Mfg. Co., Quiet Kool Div., 135 New Jersey R. R. Ave., Newark, N. J. (AC-W)



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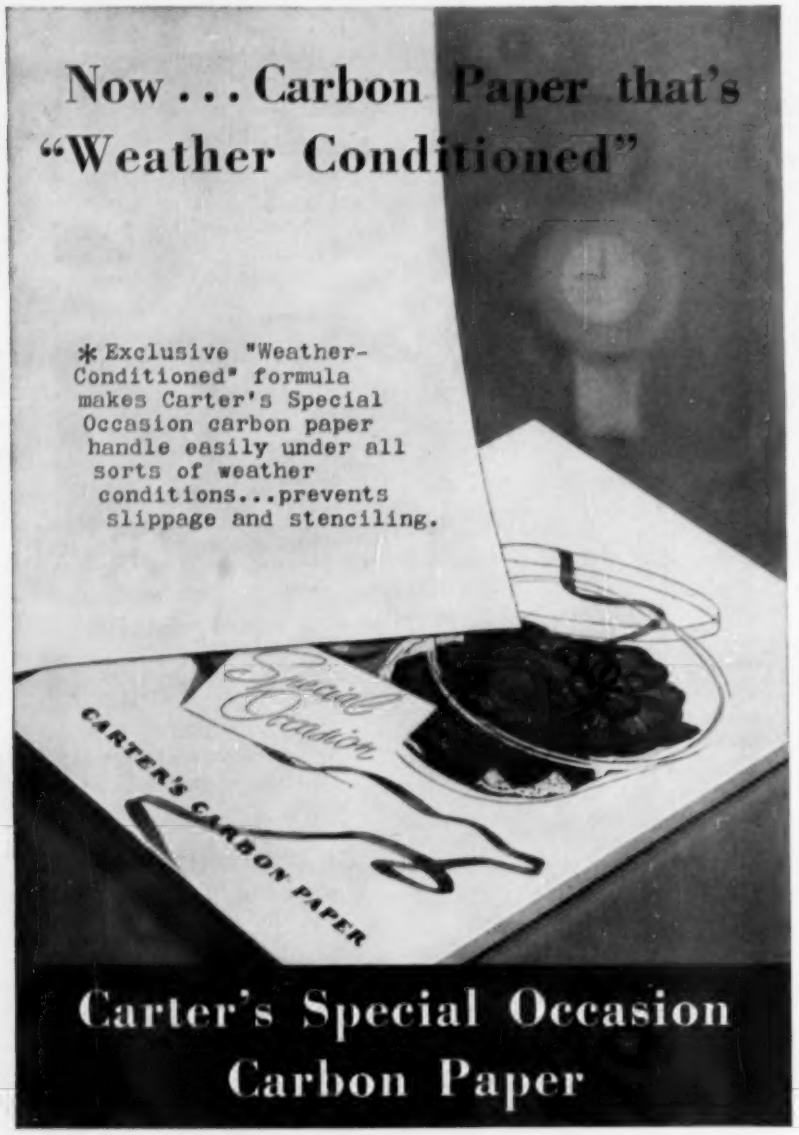
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Servel, Inc., 119 *N. Morton Ave., Evansville* 20, *Ind. (AC-W)*

Signal Electric Mfg. Co., 1823 *Thirteenth St., Menominee, Mich. (F)*

Spitzka Mfg. Co., 235 *Colfax St., N. Sacramento, Calif. (F—including models with cooling features, H)*

Stratfield Co., 434 *Grand St., Bridgeport, Conn. (F)*

Sub-Zero Freezer Co., Inc., P.O. Box 2017, *Madison, Wis. (AC-W)*

Superior Electric Products Corp., 1507-17 *Independence St., Cape Girardeau, Mo. (F)*

The O. A. Sutton Corp., 1812 *W. Second St., Wichita* 1, *Kans. (AC-W, F)*

Tele King Corp., 601 *W. 26th St., New York* 1. *(NI)*

The Trane Co., La Crosse, Wis. (AC-CW, D, F)

Typhoon Air Conditioning Co., Inc., 505 *Carroll St., Brooklyn* 15, *N. Y. (AC-CA, AC-CW, AC-W)*

Tywel Mfg. Co., 5702 *First Ave., Brooklyn* 19, *N. Y. (NI)*

United States Air Conditioning Corp., 3300 *Como Ave., S.E., Minneapolis* 14. *(AC-CW, F)*

Universal Major Electric Appliances, Inc., E. Kibby St., & D. T. & I. R. R., Lima, Ohio. (NI)

Victor Electric Products, Inc., 2950 *Robertson Rd., Cincinnati* 9. *(F)*

Victor Products Corp., 901 *Pope Ave., Hagerstown, Md. (NI)*

Viking Air Conditioning Corp., 5601 *Walworth Ave., Cleveland* 2. *(F)*

Walton Laboratories, Inc., 1188 *Grove St., Irvington, N. J. (H)*

Welbilt Stove Co., Inc., Maspeth 78, N. Y. (AC-W)

W. W. Welch Co., Enquirer Bldg., Cincinnati 2, (F)

Westinghouse Electric Corp., 3 Gateway Center, Pittsburgh. (AC-CW, AC-W, F)

Wilster, Inc., 5700 Detroit Ave., Cleveland 2. (F)

Worthington Corp., Holyoke, Mass. (AC-CW, AC-CH, AC-W, F)

York Corp., York, Pa. (AC-CA, AC-CW, AC-W)

Floor Coverings

This list includes manufacturers of carpeting, linoleum, tiles of various types, and similar materials.

Ace Lite Step Co., 1708 State St., Chicago 16.

Ace Rubber Products, Inc., Akron, Ohio.

Aldon Rug Mills, Lenni Mills, Pa.

American Abrasive Metals Co., 424 Coit, Irvington, N. J.

American Biltrite Rubber Co., Trenton 2, N. J.

American Brakeblok Div., American Brake Shoe Co., 4600 Merritt Ave., Detroit.

American Tile & Rubber Co., Perrine Ave., Trenton, N. J.

Armstrong Cork Co., Liberty & Mary Sts., Lancaster, Pa.

Artloom Carpet Co., Inc., Allegheny Ave. & Howard St., Philadelphia 33.

Bigelow Sanford Carpet Co., 140 Madison Ave., New York.

Bird & Son, Inc., 47 Wilson St., East Walpole, Mass.

Bonafide Mills, 295 Fifth Ave., New York.

E. L. Bruce Co., 1700 Thomas St., Memphis, Tenn.

The Philip Carey Mfg. Co., Wayne Ave., at Cooper, Cincinnati.

Carthage Mills, Inc., 124 W. 66th St., Cincinnati.

Congoleum-Nairn Co., 195 Belgrove Drive, Kearny, N. J.

Conneaut Rubber & Plastic Co., Conneaut, Ohio.

Danbury Rubber Co., Flooring Div., Danbury, Conn.

Deltox Rug Co., Oshkosh, Wis.

Delaware Floor Products Div.,

New . . . a Typewriter Ribbon that gives "Executive Tone" plus long mileage.
* with a special bonus ...Carter's Silvertip Clean End, to keep fingers clean... Secretaries happy when ribbons are changed.
Carter's SUPER Nylon
CARTER'S Super NYLON
Carter's Super Nylon Ribbon

Carter's "Super Nylon", with the Silver Tip, gives typed letters that "steel engraved Executive Tone."

Carter's "Super Nylon" gives you more "mileage" per penny than ordinary ribbons.

Carter's "Super Nylon" comes in three inkings, and in special tough fabrics for hard-pounding electric typewriters . . .

These are just three good reasons why Carter's Super Nylon ribbons are actually less expensive than ordinary "economy brand" ribbons.

For real proof of Super Nylon superiority, buy a dozen from your local dealer. We have a hunch that after you have given that trial dozen your own rigid test, you'll Standardize on Carter's Super Nylons.

On Sale at Leading Stationers and Office Outfitters

THE CARTER'S INK COMPANY

CAMBRIDGE 42, MASSACHUSETTS

Christiana Ave., Wilmington, Del.

Densten Felt & Hair Co., Ninth & Ontario Sts., Philadelphia.

Duraflex Corp., 411-13 E. 25th St., Baltimore 18.

Eagle Ottawa Leather Co., Grand Haven, Mich.

Firth Carpet Co., 295 Fifth Ave., New York.

The Flintkote Co., The Tile-Tex Div., 1232 McKinley Ave., Chicago Heights, Ill.

Fremont Rubber Co., 2400 West State, Fremont, Ohio.

Goodall Fabrics, 525 Madison Ave., New York 22.

The B. F. Goodrich Co., 500 S. Main St., Akron, Ohio.

Goodyear Tire & Rubber Co., Rubber Tile Div., 1144 E. Market, Akron, Ohio.

Hachmeister, Inc., 23rd & Forbes, Pittsburgh, Pa.

Hanley Co., Bradford, Pa.

Hardwick & Magee Co., Inc., Seventh St., & Lehigh Ave., Philadelphia.

Hood Rubber Co., Nichols Ave., Watertown 72, Mass.

Johns-Manville Corp., 22 E. 40th St., New York 16.

Kentile, Inc., 58 Second Ave., Brooklyn 15, N. Y.

Charles Lachman Co., Inc., 953 Grant, Phoenixville, Pa.

Laclede-Christy Co., 2002 Hampton Ave., St. Louis.

James Lees & Sons Co., Bridgeport, Pa.

Magee Carpet Co., 295 Fifth Ave., New York.

Mastic Tile Corp. of America, Newburgh, N. Y.

Mohawk Carpet Mills, Lyon St., Amsterdam, N. Y.

Mundet Cork Corporation, Insulation Div., 7203 Tonnelle Ave., North Bergen, N. J.

National Tile & Mfg. Co., Anderson, Ind.

Nye-Wait Co., Inc., Auburn, N. Y.

Oxychloride Cement Association, Inc., 1029 Connecticut Ave., Washington, D. C.

Pabco Products, Inc., Fourth & Brannan, San Francisco.

Philadelphia Carpet Co., Allegheny Ave. & C. St., Philadelphia.

The R. C. A. Rubber Co., 1833 E. Market St., Akron 5, Ohio.

Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.

Robbins Floor Products, Inc., Tuscumbia, Ala.

Roxbury Carpet Co., Saxonville, Mass.

Rubber Products, Inc., Tampa & Washington Sts., Tampa 2, Fla.

Sandura Co. Inc., Sansom & 17th St., Philadelphia.

Shelton Looms, Shelton, Conn.

Sloane-Delaware Floor Products, 295 Fifth Ave., New York 16.

Alexander Smith, Inc., 295 Fifth Ave., New York 16.

Surprenant Mfg. Co., 199 Washington, Boston.

Thomas Moulding Floor Mfg. Co., 228 N. LaSalle St., Chicago.

Uvalde Rock & Asphalt Co., P. O. Box 531, San Antonio 6, Tex.

M. J. Whittall Associates, Worcester, Mass.

Wright Mfg. Co., P. O. Box 6567, Houston, Tex.

Overhead Lighting Fixtures

Benjamin Electric Mfg. Co., Des Plaines, Ill.

Corning Glass Works, Corning, N. Y.

Demand the Best in Quality

PLYMOUTH RUBBER BANDS

conform to Federal Specifications

SOLD ONLY THROUGH RECOGNIZED WHOLESALERS

OUTSTRETCH...
OUTLAST...
OUTSELL...
ALL OTHERS

PLYMOUTH RUBBER COMPANY, INC.

FOUNDED 1896 *The Largest Rubberizers of Cloth in the World* CANTON, MASS.

Curtis Lighting, Inc., 6135 *W. 65th St., Chicago.*

Day-Brite Lighting Co., Inc., 16 *N. Ninth St., St. Louis.*

Electron Corp., 5100 *S. Santa Fe, Littleton, Colo.*

General Electric Co., Schenectady 5, *N. Y.*

Gruber Brothers, 125 *S. First St., Brooklyn* 11, *N. Y.*

Edwin F. Guth Co., 2615 *Washington Blvd., St. Louis* 3.

Holdenline Co., 2301 *Scranton Rd., Cleveland* 13, *Ohio.*

Holophane Co., Inc., 342 *Madison Ave., New York* 17.

Kolite Corp., 1007 *State St., Schenectady, N. Y.*

Lam Workshop, Inc., 316 *Washington St., Brookline* 46, *Mass.*

Leader Electric Co., 3500 *North Kedzie Ave., Chicago* 18.

Lighting Products, Inc., 2259 *W. Park Ave., Highland Park, Ill.*

Lightolier, Inc., 346 *Claremont Ave., Jersey City* 5, *N. J.*

Luminous Ceilings, Inc., 2500 *W. North Ave., Chicago* 47.

Lustra Corp. of America, 36 *Washington St., Brooklyn* 1, *N. Y.*

The Miller Co., 99 *Center St., Meriden, Conn.*

Mitchell Mfg. Co., 2525 *N. Clybourn Ave., Chicago* 14.

Pittsburgh Reflector Co., 410 *Oliver Bldg., Pittsburgh* 22.

Silvray Lighting, Inc., 1270 *Sixth Ave., New York.*

Sunbeam Lighting Co., 777 *E.* 14*th Pl., Los Angeles* 21.

Swing-O-Lite Corp., 13 *Moonachie Rd., Hackensack, N. J.*

Sylvania Electric Products, Inc., 1740 *Broadway, New York* 19.

Vision Aids, Inc., R K O Bldg., Radio City, New York 20.

The Wakefield Co., 731 *S. Water St., Vermilion, Ohio.*

Westinghouse Electric Corp., 3 *Gateway Center, Pittsburgh.*

Movable Office Partitions

Acme Central Metal Products Co., Inc., 3246 *Ettie St., Oakland* 8, *Calif.*

Acme Steel Office Partition & Shelving Co., Inc., 130 *Steuben St., Brooklyn* 5, *N. Y.*

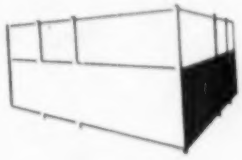
Add-A-Unit Partition Co., 946 *W. North Ave., Chicago* 22.

Aetna Steel Products Corp., Arnot Jamestown Div., Jamestown, N. Y.

All Metal Partition Co., Inc., 194-204 *DuPont St., Brooklyn* 22, *N. Y.*

American Bamboo Corp., 171-06 *Jamaica Ave., Jamaica, N. Y. (Folding doors.)*

American Sanitary Partition Corp., Flex-Wall Div., 37-03 21*st St., Long Island City, N. Y.*



Arnot Jamestown Div. See: *Aetna Steel Products Corp.*

Art Metal Construction Co., Jones & Gifford Aves., Jamestown, N. Y.

Art Steel Sales Corp., 170 *W.* 233*rd St., New York.*

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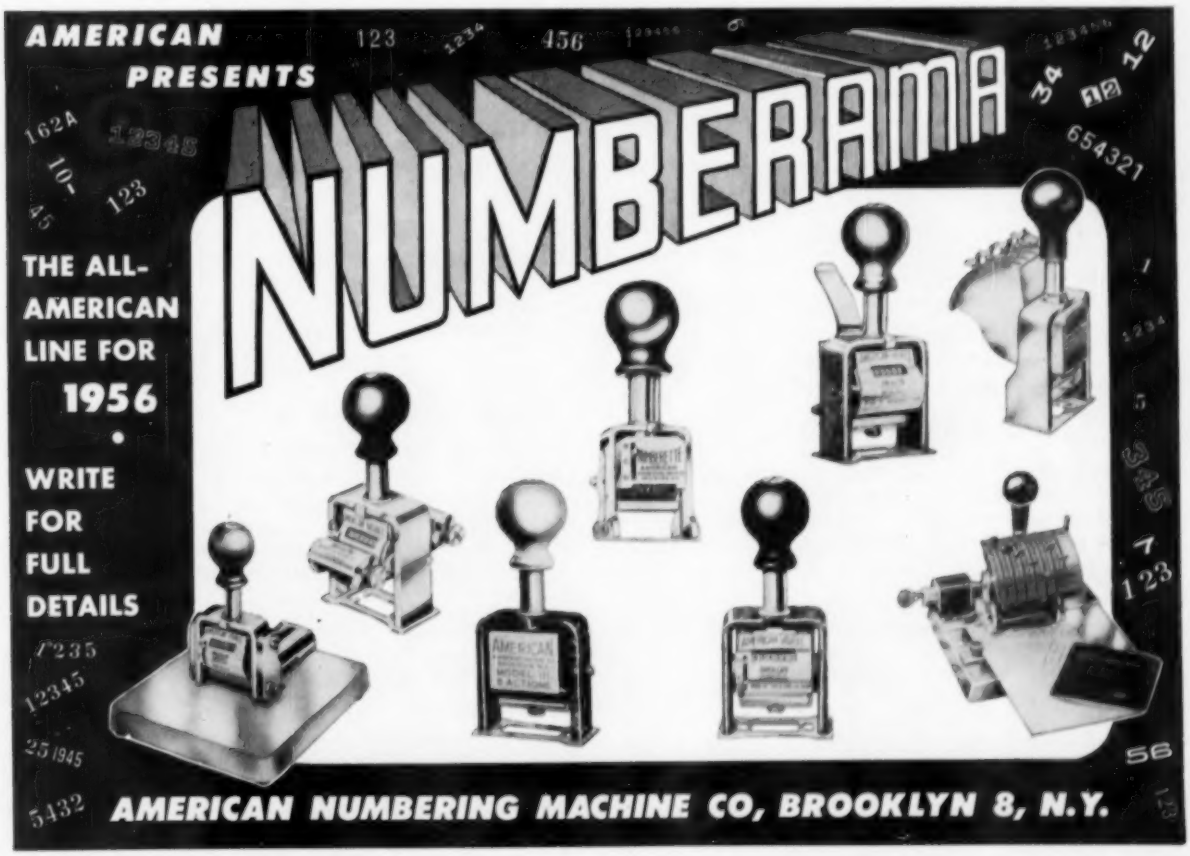

office management

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Preview of events — 1956

Conference, "The Practical Utilization of Recorded Knowledge." Cleveland, January 16-18.
Sponsor: Western Reserve University. *Place*: Western Reserve University.

AMA General Management Conference. San Francisco, January 24-27.
Sponsor: American Management Association. *Place*: Fairmont Hotel.

Executive Development Course. College Station, Texas, January 29-February 18.
Sponsor: Agricultural and Mechanical College of Texas. *Place*: College Station, Texas.

Western Computer Conference and Exhibit. San Francisco, February 7-9.
Sponsors: American Institute of Electrical Engineers; Institute of Radio Engineers; Association for Computing Machinery. *Place*: Fairmont Hotel.

NYU Middle Management Executive Development Program. New York, 15 Tuesdays beginning February 7.
Sponsor: New York University. *Place*: Washington Square Campus, NYU.

OMAC Business Show. Chicago, February 12-15.
Sponsor: Office Management Association of Chicago. *Place*: Conrad Hilton Hotel.

LSU High-Speed Computer Conference. Baton Rouge, February 14-17.
Sponsor: College of Commerce, Louisiana State University. *Place*: Pleasant Hall, LSU.

AMA Personnel Conference. Chicago, February 15-17.
Sponsor: American Management Association. *Place*: The Palmer House.

Seminar, "Electronics for Business." Milwaukee, February 16.
Sponsors: Milwaukee Chapter, Systems and Procedures Association of America; Marquette University. *Place*: Marquette University.

1956 British Industries Fair. London and Birmingham, England, February 22-March 2 and April 23-May 4.
Sponsor: British Industries Fair, Ltd. *Places*: In February, Earls Court, London. In April, Olympia Hall, London (office and other equipment), and Birmingham (heavy industry).

LSU Personnel Management Conference. Baton Rouge, February 23-24.
Sponsor: College of Commerce, Louisiana State University, *Place*: Pleasant Hall, LSU.

CIA Southern Regional Conference. Edgewater Park, Miss., February 23-25..
Sponsor: Controllers Institute of America. *Place*: Edgewater Gulf Hotel.

AMA Electronics Conference and Exhibit. New York, February 27-29.
Sponsor: American Management Association. *Place*: Hotel Commodore.

Management Engineering Conference. College Station, Texas, March 1-2.
Sponsor: Agricultural and Mechanical College of Texas. *Place*: College Station, Texas.

Personnel Management Conference. Urbana, Ill., March 6-7.
Sponsor: Bureau of Business Management, College of Commerce, University of Illinois. *Place*: University of Illinois.

Management Conference. Chicago, March 31.
Sponsors: Executive Program Club; School of Business, University of Chicago. *Place*: Conrad Hilton Hotel (not confirmed at press time).

NACA Regional Cost Conference. Philadelphia, April 6-7.
Sponsor: National Association of Cost Accountants. *Place*: Benjamin Franklin Hotel.

RS&PA Spring Meeting. Chicago, April 17-19.
Sponsor: Railway Systems and Procedures Association. *Place*: Hotel Morrison.

AMA Finance Conference. New York, April 19-20.
Sponsor: American Management Association. *Place*: Hotel Plaza.

Foremen-Management Conference, Lafayette, Ind., April 20-21.
Sponsor: Purdue University. *Place*: Purdue University.

NACA Regional Cost Conference. Lansing, Mich., April 21.
Sponsor: National Association of Cost Accountants. *Place*: Olds Hotel.

National Secretaries Week, April 22-28.

National Secretaries Day. April 25.

Microfilm Meeting. Chicago, April 23-24.
Sponsor: National Microfilm Association. *Place*: Congress Hotel.

AMA Office Management Conference. New York, April 23-24.
Sponsor: American Management Association. *Place*: Hotel Roosevelt.

Southern California Business Show. Los Angeles, April 24-27.
Sponsor: National Association of Cost Accountants. *Place*: The Ambassador Hotel.

Business Economists Conference. Chicago, April 26-27.
Sponsor: School of Business. University of Chicago. *Place*: University of Chicago.

CIA Western Conference. Phoenix, Ariz., April 26-28.
Sponsor: Controllers Institute of America. *Place*: Arizona Biltmore Hotel.

AMA Insurance Conference. New York, May 9-11.
Sponsor: American Management Association. *Place*: Hotel Roosevelt.

Indiana Personnel Association Conference. Lafayette, Ind., May 14-15.
Sponsor: Purdue University. *Place*: Purdue University.

AMA Personnel Conference. New York, May 17-18.
Sponsor: American Management Association. *Place*: Hotel Roosevelt.

CIA Mid-Western Conference. Dayton, Ohio, May 20-22.
Sponsor: Controllers Institute of America. *Place*: Biltmore Hotel.

NOMA International Conference and Exposition. Philadelphia, May 20-24.
Sponsor: National Office Management Association. *Places*: Benjamin Franklin Hotel; Convention Hall, Commercial Museum.

IASA Insurance Conference. New York, May 21-23.
Sponsor: Insurance Accounting and Statistical Association. *Place*: Hotel New Yorker.

AMA General Management Conference. New York, May 23-25.
Sponsor: American Management Association. *Place*: Hotel Roosevelt.

Institute on Records Management. Washington, June 18-29.
Sponsors: The American University; National Archives and Record Service. *Place*: The American University.

NACA International Cost Conference. Chicago, June 24-28.
Sponsor: National Association of Cost Accountants. *Place*: Conrad Hilton Hotel.

NMAA National Convention. Houston, June 27-29.
Sponsor: National Machine Accountants Association. *Place*: Shamrock-Hilton Hotel.

Preview of 1956 events—

NSA Convention. Detroit, July 18-21.
Sponsor: National Secretaries Association. *Place*: Hotel Statler.

Conference on Records Management. New York, September 17-18.
Sponsors: National Records Management Council, Inc.; Graduate School of Business Administration, New York University. *Place*: New York University.

AMA Personnel Conference. New York, September 17-19.
Sponsor: American Management Association. *Place*: Hotel Statler.

AIA Annual Meeting. Seattle, September 22-27.
Sponsor: American Institute of Accountants. *Place*: Olympic Hotel.

Conference on Training in Business and Industry. Lafayette, Ind., September 26-28.
Sponsor: Purdue University. *Place*: Purdue University.

CIA National Conference. New York, September 30-October 3.
Sponsor: Controllers Institute of America. *Place*: Waldorf-Astoria Hotel.

Purchasing Conference and Products Exhibit. Chicago, October 14-17.
Sponsor: National Institute of Governmental Purchasing, Inc. *Place*: Conrad Hilton Hotel.

AMA Office Management Conference. New York, October 15-17.
Sponsor: American Management Association. *Place*: Hotel Sheraton-Astor.

National Business Show. New York, October 15-19.
Sponsor: Office Executives Association of New York (New York Chapter of the National Office Management Association). *Place*: New York Coliseum.

SPA International Systems Meeting. Philadelphia, October 22-24.
Sponsor: Systems and Procedures Association of America. *Place*: Hotel Bellevue-Stratford.

IMS Time and Motion Study and Management Clinic. Chicago, October 31-November 2.
Sponsor: Industrial Management Society. *Place*: Hotel Sherman.

AMA Finance Conference. October 31-November 2.
Sponsor: American Management Association. *Place*: Hotel Roosevelt.

Federal Tax Conference. Chicago, October (dates not confirmed at press time).
Sponsors: Law School and University College, University of Chicago. *Place*: To be announced.

AMA Insurance Conference. Chicago, November 14-16.
Sponsor: American Management Association. *Place*: The Palmer House.

Industrial Management Institute. Urbana, Ill., dates to be announced.
Sponsor: College of Commerce and Business Administration, University of Illinois. *Place*: University of Illinois.

Office Management Conference. Urbana, Ill., dates to be announced.
Sponsor: College of Commerce and Business Administration, University of Illinois. *Place*: University of Illinois.

New York University inaugurates retirement counseling center

A retirement counseling center to serve the needs of business, industry, government, the community, and the individual has been established at New York University. The new center will draw upon the resources of the University in dealing with the problems of older people. It will be a unit of NYU's Office of Special Services to Business and Industry. Additional information can be obtained by writing to Dr. Alonzo F. Myers, director, Retirement Counseling Center, New York University, 6 Washington Square North, New York 3, N. Y.

Art exhibit sponsored in Bridgeport by Underwood

A novel approach to employee and community relations has been taken by the Underwood Corp. in the form of an exhibit of paintings by leading contemporary American artists. The show was held recently in the Underwood factory in Bridgeport, Conn. It included 35 paintings selected to represent the scope of present-day art in this country. In addition, lectures and films on contemporary arts were offered to the public. Underwood reported that the response had been excellent.

Metropolitan Life orders two more Univacs for non-actuarial work

The Metropolitan Life Insurance Co, has ordered two additional Univac electronic data processing systems from Remington Rand, Div. of Sperry Rand Corp., it was announced recently The contract calls for delivery of the equipment early in the year.

Metropolitan is planning to put the additional Univacs to work in new areas beyond the actuarial statistical problems that the company's first computer has been handling during the past year.

Moore Business Forms opens new division in New Jersey

Moore Business Forms, Inc., manufacturers of business forms since 1882, has recently announced the formation of a new division to be known as Stock Forms Co. Herbert J. Orchison, formerly a sales executive of the Pacific division, has been named general manager. Executive offices will be located in a new office and warehouse building to be erected on South Dean St., Englewood, N. J. Temporary offices and a warehouse have been established at 345 Commercial Ave., Palisades Park, N. J.

Many businesses using 1954 tax law depreciation methods, AIA reports

About 17 per cent of corporation reports analyzed by the American Institute of Accountants mentioned changes of depreciation method as permitted by the 1954 revision of the International Revenue Code, it was announced recently. Of the companies reporting changes, 38 per cent used the declining balance method and 41 per cent the sum-of-the-years'-digits method, some using both methods for different classes of assets.

Union leaders will discuss recent merger at February AMA meeting

The implications for business of the AFL-CIO merger will be highlighted at the American Management Association's mid-winter personnel conference at The Palmer House, Chicago, Feb. 15-17. Four national union leaders, Dave Beck, James B. Carey, David J. McDonald, and A. J. Hayes, will be interviewed on the merger and its effect on a number of labor relations and personnel administration problems.

Current books of significance

Office Automation

Described as a "layman's manual" on electronics in the office for office workers of all categories, business executives, and others, R. Hunt Brown's new book, *Office Automation,* is designed to explain the mysteries of that subject in non-technical language. Mr. Brown, a consulting engineer, points out that automation is now available to small and medium-sized businesses as well as to major organizations. He takes the view that "watchful waiting" is dangerous, because a company that does not look into automation immediately may find itself at a serious disadvantage, competitively, as other companies automate. The book defines the basic terms and principles of the subject and describes the major equipment available. It deals also with new accounting methods and procedures and with social and humanitarian aspects of automation. Mr. Brown believes that automation "will displace drudgery, not people" and that working hours will shorten, living standards will rise, and jobs will be upgraded. Other subjects treated include operations research, applied cybernetics, automatic programming, stereatronics, ultrasonics, and information theory. The book is published by Automation Consultants, Inc., 1450 Broadway, New York. It is priced at $12.50. The author also offers a service to keep the book up to date; this is priced at $25 a year.

Electronics in Business

The Controllership Foundation, Inc., 2 Park Ave., New York, has published the second in a series of reference works on electronic equipment as used in business. The first, *Business Applications of Electronic Machines,* appeared in 1954. The second volume is called *Electronics in Business: A Descriptive Reference Guide.* The new book contains an extensive bibliography on the subject, covering both books and periodicals. It also lists and describes electronic computer systems available in this country, together with listings of actual installations of such systems in American concerns. The book is obtainable from the Foundation at a price of $2.

Personnel Management

Case Problems in Personnel Management, by Roger M. Bellows, Ph.D., uses the case history approach to develop skill in handling personnel problems. The author comments that the ideal method for a student of personnel management to get the experience necessary to practice his profession successfully would be to serve an "internship" in a number of different companies. But since this is seldom possible, the case history method is used to provide him with "vicarious experience." The 57 cases selected are related to group techniques and methods rather than to cases involving individuals. Answers to the problems are not given. Rather the cases are presented for analysis and discussion, with suggested sources of materials and methods for solving them. The book is priced at $3 and is available from the publisher, Wm. C. Brown Co., 915 Main St., Dubuque, Iowa.

Running a Small Business

The second edition of J. K. Lasser's *How to Run a Small Business* has been published by the McGraw-Hill Book Co., 330 W. 42nd St., New York. The work has been revised by Sydney Prerau, director, J. K. Lasser Tax Institute. A 332-page volume, it covers, from the standpoint of the small business, such subjects as business ownership, financing, records and controls, and operation. The book is priced at $4.95.

Corporate Secretary's Guide

A revised edition of the *Corporate Secretary's Manual and Guide* is now available from the Parker Publishing Co., Inc., Fifth Ave. at 13th St., New York, at a price of $12.50. The book outlines the duties of corporate officers, provides legal advice and procedures, and offers instructions on such matters as conducting directors' or stockholders' meetings, writing annual reports, drawing up resolutions, and setting up systems for tax records, insurance records, and document files. A feature of the revised edition is the inclusion of warnings, in heavy type, in connection with every topic discussed. The index is extensive, running to 65 pages.

Job Evaluation

Recognizing the importance of fair wage and salary administration and its dependence on job evaluation programs, E. Lanham, Ph.D., Associate Professor of Management, The University of Texas, has written a new book called *Job Evaluation,* which describes the steps necessary in installing and maintaining such a program. It deals with such matters as preliminary steps, the role of organized labor in job evaluation, selection of rating plans, methods of measurement (including ranking, grading, point, and factor-comparison methods), job analysis, job description, job rating, employee classification, wage surveys, rate structures, administration policies, and control of the program. The book is published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, and is priced at $6.

Profit Sharing for Small Business

The Profit Sharing Research Foundation, 1718 Sherman Ave., Evanston, Ill., has made available a new research publication called *Profit Sharing for Small Business.* This is a 64-page booklet designed to help owners of small companies (less than 100 employees) who are interested in profit sharing plans. The report is priced at $1.

Government Services

The Businessman's Guide to Government Information and Advice, has been published by the American Association for Public Information, Education & Research, Washington 5, D. C. It is edited by Sherman S. Cohen, vice president and general counsel for the association. According to the book, "Though many people are not aware of it, the U. S. Government has become an invaluable source of advice and information for businessmen and their advisers. A glance at the official lists of federal government publications, most of which are available at negligible cost, will reveal the scope of the advice and information currently offered to business — covering such primary fields of interest as domestic and foreign commerce, labor relations, market research, production, and finance." The book contains an an-

attractive Sengbusch office aids

Capillary-Action Handipen Desk Set

Capillary-action Handi-Pen desk set holds ink supply equivalent to 100 fountain pen fillings. Keeps ink fresh—can't flood or clog.

Sanitouch Moistener

Moisteners — a complete line for every need.

Cata-Rack keeps heavy catalogs and books at fingertips for instant use.

No-Over-Flo Sponge Cup

Kleradesk organizes papers — keeps desk top always neat. Easily expandable.

Adapto-Rack clears the desk for action! Adds business-like good looks to any office. Very flexible.

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notated bibliography of important Government publications, together with a directory of key personnel responsible for the compilation and publication of economic and business data.

Duplicating Methods

The Department of the Navy has prepared two manuals concerned with office duplication. One, called *Introduction to Reproducing and Duplicating*, contains descriptive material and illustrations of a number of the basic duplicating methods. The second, an Office Equipment Guide, is concerned with stencil preparation techniques. Priced at 30 and 15 cents respectively, they are obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Automation 1956—

(*From page* 16)

letters of the alphabet, the digits, and certain operating instructions as well. The tape can be created by a punching mechanism attached to a typewriter. It can then be placed on a transmitter, and the coded information embodied in the tape is then transmitted over telegraph wires to a receiving mechanism at a distant point, which punches an exact duplicate of the sending tape. This duplicate tape can then be placed on a "reading mechanism" attached to an automatic typewriter at the receiving point to re-create a legible copy of all the information originally typed and coded at the sending point.

Moreover the punched paper tape can be used with other type-creating machines besides the typewriter.

Thus, the application of tape-punching and tape-reading mechanisms to the second great family of office machines —the type-creating machines—rounded out the integrated data processing principle as far as large offices were concerned. Information could be entered on a machine in a sending point in one city, creating multiple-form legible copies for use within the sending office, and simultaneously creating a by-product tape. The tape then could be used to transmit all the information appearing on the legible copies to a central office half a continent away.

There, pre-positioned forms inserted in receiving machines would pick up precisely the same information recorded in the originating office. Simultaneously an exact duplicate of the tape being used to transmit information would be created by a tape-punching mechanism in the receiving office. The legible forms created in the receiving office could be used for immediate processing needs there; the tape created could continue to carry the information forward, in combination with prepared control tapes carrying standard information and directions, from one machine to the next in the processing sequence. Each machine in the ongoing sequence would, in addition to creating the legible copies needed at each successive stage for immediate processing, also create a fresh tape carrying all the information entered in the machine, plus the results of the machine's own operations, for entry in the tape reading mechanism of the next machine in sequence.

The tape processing machines offered a new dimension which met another peculiar need of the office; the need for two more or less simultaneous uses of any bit of information feeding through clerical processing. Thus, each bit of information is destined for a certain primary end result, but is also needed for various other office products. The tape reading and punching mechanisms met this dual need. Each bit of information could proceed automatically toward its major end result, while creating at each processing step the necessary legible copies for subsidiary use by human workers at that point. This in effect eliminated unnecessary recopying, speeded the movement of data toward their primary end result, and still supplied all necessary information copies to all concerned at every step of the way.

The final bridging of the gap between the tape-reading machines and the punched card machines was brought about by the development of converters which could translate the "language" of punched cards into the language of the punched paper tape, and vice versa. This rounded out the concept of integrated data processing, and made the achievement of the first standard of that concept, "information captured at the point of entry in some form that would permit it to go through all subsequent processing without ever being manually recopied," possible for every office, the

very large as well as the very small.

But it should be noted that the machines merely made it possible to extend a concept which was already available to the small office with a few workers through such a simple measure as intelligent forms design. Moreover, even in the medium-sized and large offices which can employ the punched card and punched tape machines economically, the legible copies which are the basis of secondary uses of the data, are created by use of multiple carbon-interleaved forms. Thus, the same principle that can give integrated data processing to the small office with no machines to speak of, is basic in the large office with complex machines.

And integrated data processing is the basis of office automation.

Automation—more than machinery

Thus, automation is not a matter of an electronic data processor, although the data processor plays an important role in automation for an office large enough to warrant its use, any more than it is a matter of punched paper tape applications or punched card applications. The machines merely make it possible for automation to be applied in any office. The handicap the vast office with a multitude of departments once faced is being eliminated by the wide variety of machines that have and are being developed.

The machines give the same integrated data processing advantages to the large office that were once available only to the small office, and also compensate by speed and automatic control of operations for the mass of data the large office must handle.

The punched cards made it possible for a large office to handle thousands of bookkeeping transactions automatically in the same time the small office needed to handle its transactions with simpler machines.

The punched paper tape made it possible for a company with offices scattered across several states to transmit information automatically between those offices just as the small office could transmit information automatically by use of multiple copy forms. But the punched paper tape also, like the punched cards, made it possible to automate operations on data as well as eliminate the constant recopying of data.

Machines are a matter of degree, in other words. Some machines are appropriate to some offices, other machines to other installations.

Automation as a work concept is valuable to every office.

This realization puts in proper perspective the electronic data processor which has won so much praise, and which has simultaneously been subjected to so much debunking. Both have been merited. An electronic data processor, when used by a company which has prepared for it intelligently, and which is large enough to justify its use, is the most remarkable machine yet developed for handling basic clerical repetitive routine. An electronic data processor, bought or rented by a company in which those two conditions do not apply, is an economic waste, and does not bring—at least for some long time—benefits over the old system at all.

Thus, an electronic data processor has certain advantages over any other machine but they are advantages that apply only in certain contexts. Each machine complex represents a stage in an ascending scale, as it were; each is appropriate to one type of office, or within the departments of a very large office. But the more complex levels are not appropriate for offices below a certain size and work load.

Forms design alone gives us basic integrated data processing in the very smallest units. Punched cards give us automatic control, not only of the repetition of data but of the processing of data as well, in larger offices. Punched paper tape adds the dimension of instantaneous transmission of data over great distances, and rounds out the concept of automatic control of operations as well as automatic repetition of data.

The electronic data processor adds two factors to the abilities already obtainable with the other machine levels outlined. It works as a self-contained unit, carrying out an entire sequence of operations within itself. Thus, it eliminates the need for entire batteries of subsidiary machines required in any of the lower levels. Moreover—and this is basically its greatest advantage—it operates at fantastic speeds. Thus, for great masses of data, it offers advantages that the simpler machine levels do not.

But for a company that does not have great masses of data, this is no

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great advantage. Even the electronic data processor, in other words, is just another machine, appropriate in some instances, wholly inappropriate in others.

There is an important new advantage offered by the electronic data processor entirely aside from its ability to carry forward routine data processing activities—its ability, in other words, to replace a large group of clerks and simple machines carrying out day-to-day routines. That is its use in forecasting, in estimating probabilities.

This does not imply any magical quality in the computer. The data processor cannot perform any single calculation that cannot be performed equally well by a man, or cannot be duplicated by a simpler machine. But, it can, by its tremendous rate of speed, perform such a vast number of computations that involved mathematical problems insoluble by conventional methods because of time limitations are made easily soluble.

The computer can, in estimating probabilities, take into account more factors than it has ever been possible to consider before. It can give a range of probabilities based on these factors more exhaustive and mathematically exact than any ever available before.

Moreover, it can do this so fast that the solutions are based on fresh, current information, rather than historical information.

This seems to be the most important promise the computer offers American business today. It is perfectly true that the computer can take over entire areas of routine data processing operations, replacing batteries of less complex machines in the process. Moreover, it can do the routine work faster than the ordinary machines. But its capacity is so great that relatively few companies stand to gain a very great deal by using computers for routine duties alone; the machine is simply too high-powered for the work load. The simpler data processing units will do the job equally well.

But in the range of forecasting, of operations research, of taking into account every known fact, and forecasting an entire range of possible results of some contemplated action, the computer is peerless. Its great capacity gives it in effect abilities which no other machine has.

That is the major contribution which the data processor has for business: as a research instrument, a guide to management in making decisions, rather than as a unit to take over traditional clerical operations.

Computers not a "must"

This view of the major usefulness of the computer has been gaining ground during the past year, as more and more companies recognized the fact that the computer was offering them entire new horizons, not a new way to do old jobs. But again, it underlines the fact that a computer is not a must for every company, nor even for the majority of companies. This type of computer use is available even to very small companies through the data processing centers that are being established in more and more cities across the country by the large equipment manufacturers. These centers give the small and medium sized company, for which installation or rental of a computer on a full time basis would be economically wasteful, the same advantages enjoyed by the large concerns in using the data processor for research and forecasting operations.

Routine processing work can still be carried in the small companies by simpler machines tied together by an integrated data processing medium.

Dramatic evidence of this new realization of the major importance of the computer was offered this year by the announcement of the Sylvania Electric Products Company that it was constructing a data processing center at Camillus, N. Y. (a location selected by the same type of mathematical equating of all factors which the data processor does so well) for the summarization, consolidation and analysis of information gathered from all Sylvania's scattered installations across the country

Tied by Western Union leased wire services to Camillus, each of the individual installations sends operating information to Camillus in the form of five-channel punched paper tape created as a by-product of the creation of legible copies in the sending office. Routine processing of the transactions still occurs within the originating office; summarization, reconciliations, forecasts, and analyses, based on the total flow of information from all Sylvania installations, are made at Camillus.

Thus, Sylvania illustrates office automation in its classic sense, with each level of work automated to a degree appropriate to its volume and operating requirements. The originating Sylvania office depends on work simplification, forms revision, and tape-operated and controlled integrated data processing equipment to meet its own operating needs, and to create the by-product tape which can transmit the results of its work on to the central point. Automation is achieved in the originating office with relatively simple equipment.

At Camillus, the volume of work is heavy enough to justify use of a computer's great capacity. The various streams of incoming information are converted from the five-channel tape on which they come into the center to seven-channel tape for entry on the computer. The computer prepares the final operating reports for top management. More important still, it digests the mass of information available to it, processes it according to mathematical formulae supplied by the management of the company's various departments, and gives analyses and predictions mathematically more precise because more factors have been considered than has ever been feasible before.

But Sylvania illustrates too the importance of the concept of integrated data processing over the qualities of any one machine. The basis of the entire Sylvania system is uniformity and speed of processing in the originating offices. In other words, such relatively old-hat concepts as forms standardization and work simplification are fundamental to the whole system network. Without that basis, the whole elaborate superstructure would be impossible. It is the fact that incoming data at the originating offices are forced into standard media immediately that makes every successive step in the system possible.

Moreover, the need for speed in the originating offices is also obvious. A computer working with data a week old could give answers and results fast-

er than any other medium, it is quite true, but the final reports and analyses based on those data would still be at least a week old. Therefore speed of processing in the originating centers is vital to successful use of a computer; the computer can only work with the data supplied to it; it is vital that those data be as fresh and timely as possible if the computer is to be exploited to its fullest advantage.

This is achieved at Sylvania and at other companies that are planning similar data processing networks by use of what might be termed the second level of automation, the movement forward of data in the originating office by a mechanical medium that creates both the necessary papers for immediate use in the sending office, and a tape which carries forward the results of the data and the work done on it there.

This is a pattern of true automation, and of good planning. It is the pattern which began to take form and gain general recognition during the year just past. John A. Higgins, a partner of Arthur Andersen and Co., and a speaker at the recent University of Chicago conference on office automation, termed the present state of office automation the "era of critical re-evaluation." The phrase describes the period that began this past year very well.

Office automation at the beginning of 1955 was a catchword. Some companies were actually working toward it. But far too many companies were discovering for the first time that it was not something that could be achieved by running out and buying a computer, or a battery of tape-punching typewriters, or any other promising mechanical unit. They were discovering it the hard way—by finding that the elaborate equipment they had bought so happily in the sure conviction that their clerical troubles would soon be over had merely multiplied those troubles a thousandfold.

1955 was the year of rueful realization that achieving office automation is not itself an automatic process. It takes knowledge first of all of what automation actually is. Then it takes a great deal of hard, human work, and planning to begin to achieve it.

But 1955 was also the year of realization that the planning and the work could and did pay off; that automation, if intelligently planned and prepared for, was possible. It was the year that business calmed down, and as a result made more progress than it had before toward true automation in the clerical work areas.

Critical re-evaluation also made it obvious that there was still a long way to go before the ideal pattern of office automation could be fully realized through commercially available machines, within companies staffed with normal human beings no more susceptible to automation than they ever have been.

"Language" difficulties still exist

The machine difficulties arose from the fact that the number of common language media that can transmit information from one machine to another and activate each machine in sequence are so great that we have a host of translating problems. Thus, Sylvania transmits information from its outlying offices to the central data processing point by five-channel punched paper tape—the only way it can transmit such information by standard communications media. Yet the data processor employed at the center must use seven-channel magnetic tape for input. A special converter to transfer the information coming in on five-channel paper tape to seven-channel magnetic tape is necessary.

Such converters—tape to card, card to tape, five-channel paper tape to seven-channel magnetic tape—now must be spotted through the large company which is employing a data processor at one point, and mechanical data processing equipment at other points. The data flows automatically, but it is slowed at the conversion points. These are some of the problems equipment manufacturers will have to face and solve before the most free and flexible processing of information by automatic methods becomes possible.

The other area, human beings, poses an even harder problem for the companies considering automation. The preparatory processes for any type of automation involve straightening and simplifying the basic work flow within any office. And, as a rule, the more complex the level of the machinery involved, the larger the company that is striving for automation, the greater will be the procedural changes called for within the company.

This means that the office, which, especially in large companies, has become so rigidly departmentalized in the past, will have to reverse this whole direction. If automation implies anything, it implies a free, straight flow of work, and a fluidity of information throughout the company. This can only be achieved by a breaking down of the strict departmental lines that have existed in the past, a general pooling of clerical effort rather than concentrations of clerical strength within strictly partitioned work fields.

This will require a great deal of readjustment, particularly in the middle supervisory levels. The man who is head of a department which suddenly ceases to exist under the work revision patterns of automation is going to resist automation as a rule, even when he knows the company will find some other position for him. Individual human problems of this type will probably hinder automation more in any office than will the remote—and, in the last analysis, unlikely—prospect that many workers will be laid off. The basic clerical workers will be less of a human problem than is anticipated right now, because automation's great promise is not that the total number of clerical jobs will be reduced; it is that work will be done faster, more efficiently, and more accurately than it has ever been done before. The work the clerks do in any office will change under the impact of automation; the absolute number of clerks working in that office will probably remain just as high as it is now, and may even increase.

These were some of the problems associated with the introduction of automation that were first fully realized during the comparatively calm and constructive year just ended. They are newly-realized problems; perhaps the most difficult ones business still has to solve, for the pattern of achieving automation is now fairly clear. It is in the area of human relations and of reconciling some of the mechanical media now available that we are just beginning to realize again that any great change brings unanticipated side effects.

But one thing seems perfectly certain. "Automation" is not a flash-in-the-pan. It is a new stage, and a vitally important one in the long history of clerical activities.

(*To next page*)

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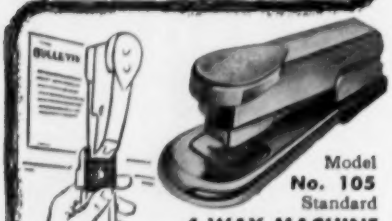

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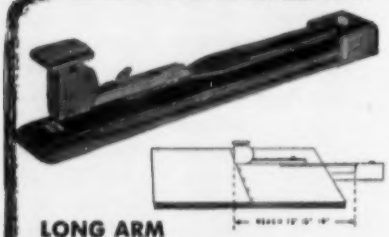

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The only thing we can be certain of is that it will profoundly affect a great many of our social institutions in various ways.

No one can foresee precisely our destination. But we can be absolutely sure, at the beginning of 1956, that we're on the road now, and that our pace is accelerating.

New records approach—

(*From page* 36)

consider the difference between eliminating only 37 per cent as against 57 per cent of ten million file drawers. The difference is two million file drawers, which require three million square feet of office space. That is about the size of the Pentagon. For the Army and the Air Force there is a Pentagon of difference between a 1955 model records management program and earlier models. Neither Mr. McCool nor Mr. Muller has received the national recognition he deserves for this remarkable performance.

Unmindful of these remarkable new developments, a state government recently asked for bids on installing a records management program. Its specifications called for many things that had not been successfully accomplished anywhere. In short, it requested now what might prove workable by 1970. Asking for a 1970 model, the state proceeded to buy a 1950 model program. The remarkable new developments of 1950-1955 were passed over in the confusion. By contrast the State of Massachusetts is presently the first state working towards a modern records management program.

Monsanto Chemical Company in 1949 was the first business to install a records management program. This was the same year the report of the first Hoover Commission's Task Force on Records Management was released. In 1955, Monsanto, with J. N. Flanagan again directing the program, was the first to incorporate the Army-Air Force successes in up-dating its management of records.

Further, Monsanto has searched out, identified and protected its more important records. The latter are no longer anonymous in the mass of temporary multiple copies. A simplified, low cost dispersal of existing copies is Monsanto's insurance against loss of any of these important records in an atomic attack, flood or fire.

Other companies are adopting the new approach of Monsanto in St. Louis. These include Air Research in Los Angeles, the Crane Company in Chicago, Wyandotte Chemical Company in Detroit, Weatherhead Company in Cleveland, Olin Mathieson in Baltimore, and the New York Telephone Company.

At the time of the Korean war and since, many companies have spent surprisingly large sums to duplicate essential records against loss as a result of atomic or hydrogen bombs. Currently, more companies, like Monsanto, are finding better protection at a fraction of earlier costs through dispersal of existing duplicates.

In an age of multiple copies, there are more than enough duplicate records available. In such cases to microfilm is to provide only another duplicate at considerable new expense. Microfilming, however, continues to be the best process for duplicating unique records, no other duplicates being available.

Enterprise hasn't been lacking to provide safe storage for insurance copies of vital records. In addition to Leahy Business Archives' security storage center in Western New Jersey, Lincoln and Iron Mountain have such centers in the Eastern and Western States. Atomic Storage has a center in the West. A new one, National Storage Company, has opened in Western Pennsylvania.

The first Hoover Commission in 1949 introduced a new type of records storage. Prescribing 15 by 12 by 10 inch storage cartons on steel shelving, it halved costs of other types of storage equipment and reduced space requirements. In 1951 Leahy Business Archives in New York proved space requirements for records storage could not only be reduced but even halved. Company centers of General Electric, DuPont, Bethlehem Steel, the New York, New Haven & Hartford Railroad, among many others, have been

modeled after this pioneer center in New York.

In 1955 a new type of steel originally developed in England and adapted to records storage by Leahy Business Archives branches in New Jersey and Miami reduced records storage space and equipment costs an additional 20 per cent. When in New York or Miami, visit these model centers and inspect the prototype of this new type of records storage.

Paralleling the Air Force approach to management of current records is the General Electric Company at Hanford, Washington. S. H. Badgett writes, "It will interest you to know that we have developed a new approach to our records evaluating and scheduling procedure. In this approach, we determine what records are needed to document each business transaction and classify all other records as unimportant. We find that only about 25 per cent of file material has such value."

Installing a similar program on a pilot basis in the largest company in its field, our consultants found that only 14 per cent of all key files had true record value and were worth retaining. Thirty per cent were temporary working papers. Fifty-six per cent were information copies or reference material for the convenience of an individual.

Not only are more and more business papers turning out to be useless or marginal, but the individual business letter and form was revealed in 1955 to be crammed with gobbledegook, commercialese or useless data.

Typically, one large aircraft company on the west coast competing for new employees in a tight labor market found that it required prospective employees to fill in their name and address 102 times before entrance on the payroll.

One of our clients found that 56 per cent of the content of its forms and reports was voluntarily eliminated, once exposed as useless. Twenty-two million strokes of the typewriter were cut out annually from the company's clerical workload before any forms were revised or eliminated. The new potential here is evident when you realize that one railroad has as many as 600 million strokes of the typewriter in processing only its waybills in one year.

More and more companies have set up or retrained specialists to improve the quality and reduce the cost of company letter-writing.

In 1955 Miss Mona Sheppard, then with General Services Administration in Washington, won the Distinguished Service Award for her successful campaign against gobbledegook and the high cost of government letter writing. Here is a typical example of a before and after letter as Miss Sheppard, now a vice president of our firm, streamlined it:

Before:

"In accordance with the terms of the award allowed in your case, payment of compensation will terminate as indicated in the compensation order previously sent you explaining the award . . . Final check should be mailed you within four weeks."

After:

"You are entitled to one more check under the terms of your award. You may expect it within a month."

Forecast for 1956

We enter 1956, therefore, faced by a host of splendid challenges for improvement and reduction of paperwork and record keeping in the nation's offices. And these challenges range from the possibilities of electronics to revamping the dreary storage of old files. In the center between these two extremes, we bring from 1955 the success of the Army and Air Force and two large companies in actually stemming the rising tide of papers.

Certainly anything done so well on so vast a scale as in the Departments of the Army and Air Force can be equalled or exceeded in business with its smaller and more tightly knit organizations.

These are auspicious signs that we have approached but not yet closed with two more basic questions:

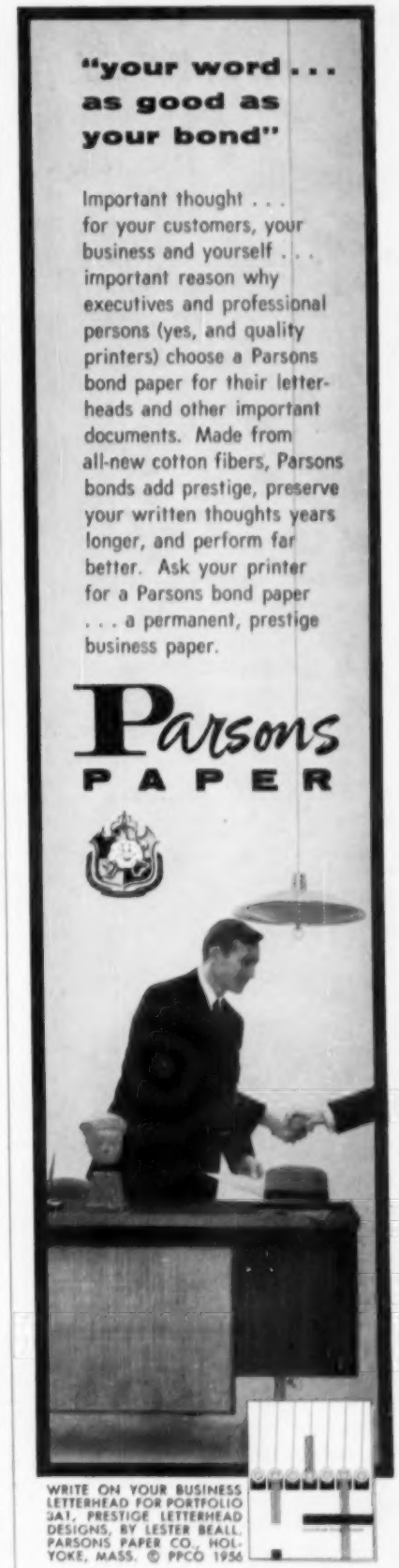
1. What percentage of records can be withheld from filing altogether and
2. What percentage of these records need not be created in the first place?

Punched cards—

(*From page* 20)

reel of magnetic tape (a cylinder 10 inches in diameter and 1½ inches in thickness) as would normally require 18,000 punched cards.

Earlier I mentioned the present capacity of a punched card as being under one hundred (100) decimal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Punched cards—

(From preceding page)

digits. When more information is required for a given item or transaction, additional cards must be prepared, thus increasing the possibility of information loss or misfiling, plus considerable duplication. For large scale information handling systems, however, punched cards have unquestionably met their match, not in any one new information storage medium, but in the combination of two or more. Magnetic tape alone is not capable of displacing cards entirely. Selecting on magnetic tape without substantial amounts of high speed random access storage would be unbearably cumbersome. But by combining tape with magnetic core and magnetic drum storage, the shortcomings of tape can be overcome, and its advantages fully exploited. In addition, the future holds promise of other methods of storage far superior to magnetic tape that will make punched cards even more obsolete than they are today. Let us look a little closer at those advantages. The first is density of storage. A reel of magnetic tape will hold, volume for volume, more than 50 times as much information as cards. The cost of the tape is little more than the cost of cards to store the same information, and it is a one time cost while the cost of the additional space required for card storage is a continuing one. Thus for long term storage, tape can hold its own against cards today. The trend in cost and density of tape storage is giving tape an ever increasing advantage. For short term information storage, tape has a strong advantage; it can be re-used many times so that the initial cost distributed over the various uses to which the tape may be put during its useful life is very much less than the cost of cards, which must be discarded after the particular information stored has outlived its usefulness.

The advantages of tape for storage that I have mentioned are substantial, but the advantages for processing are even more impressive. The reading speed of a typical tape unit today is equivalent to about 10,000 cards per minute, more than 14 times the speed of the fastest available card reader. The speed of modern information-handling machinery is so high that the tape speed is the limiting factor for any but fairly involved programs, (optimum programming.) Thus, for any modern system carrying out information processing, rather than computation, cards are so slow to handle that they would so limit the system as to destroy its advantage. Using cards for the input of a high speed computer is rather like trying to refuel a jet airliner with a teaspoon. It would seem that the business office of today must use this new medium if it is to reach the degree of automation experienced in the modern factory. I believe business will find and use this tape efficiently and economically. Let us take a look at the various types of magnetic tapes offered on the market today as shown in the chart at the bottom of the page.

Future developments will undoubtedly be directed toward even greater density, and as equipment is developed for interrogating these tapes rapidly, the punched card of today will tend to disappear.

We have heard a great deal about the automatic factory, also the automatic office. I believe both are still a far way off, but many elements of automation are here today and more are being introduced each month. The benefits from these improvements are too great to be overlooked by Management. Well thought out plans and proper organization will be essential for survival in many industries. An alert Management can make the transition to automation an orderly process, using the new tools as they become proven tools, instead of entering a period of confusion and indecision. A leading business corporation has as its slogan, "Progress is our most important product," and progress must be made the byword of Management if it is to survive. It is with this thought of progress in mind that this article has come into existence.

Type	Width	Length	Density	80 Cols. Punched Card Equivalent
Metallic	½"	1500'	128 characters to the inch	18,000
Acetate Plastic Base	½"	2400'	200 characters to the inch	60,000
Mylar Plastic Base	⅝"	2400'	125 characters to the inch	22,000 to 40,000
Wide Tape	3"	2800'	31 information channels	425,000

FOR MORE INFORMATION USE READERS' INQUIRY COUPON ON PAGE 202

Association News

THE RECORDS MANAGEMENT Association of New York met on November 14th and heard a discussion of "Work Measurement Requirements in Records Management" by Edmond W. McNamara, of The Bassick Co., Bridgeport, Conn.

THE TRANSCRIPTION SUPERVISORS' Association of New York celebrated its 25th anniversary with a dinner program at the Hotel Commodore on November 15th.

The featured speaker of the evening was Dr. Marguerite J. Fisher, Past State President of The Business & Professional Women's Clubs of New York State, Inc.

Evolution—

(*From page* 18)

ment in dull, tiresome, clerical chores —the great mass of repetitive processing work which has traditionally been the office's stock in trade. Even when people took such jobs, they were usually either lower calibre personnel than we wanted, or, if not, they moved on the moment a better job possibility offered itself. This usually did not take long, in the period of high labor demand we have been living through.

I believe this helps to explain some of the feeling of almost hysterical welcome that has greeted the swift emergence of electronic contrivances capable of taking over some of these dull, repetitive duties. Certainly we cannot explain away their unquestioned acceptance purely in terms of their abilities when we consider what happened when a machine equally remarkable in its era was developed over twenty years ago.

The date was 1933. The machine was an electric accounting machine that was able to print the alphabet. Looking back at it now, we can see that the impact of this machine was tremendous. It represented the beginning of the office evolution. It meant that tabulating equipment was ready to assume the functions of reporting as well as accounting on an automatic basis.

This was over twenty years ago.

Yet no one went into tailspins of excitement at that time. Why?

There were good reasons. The year was 1933. We were still deep in the depression. There was no pressure comparable to that existing today as far as personnel were concerned. We had more workers than we could use. There was no good economic reason for spending money on developing new machine applications. Moreover, every humane reason was against it.

War delayed mechanization

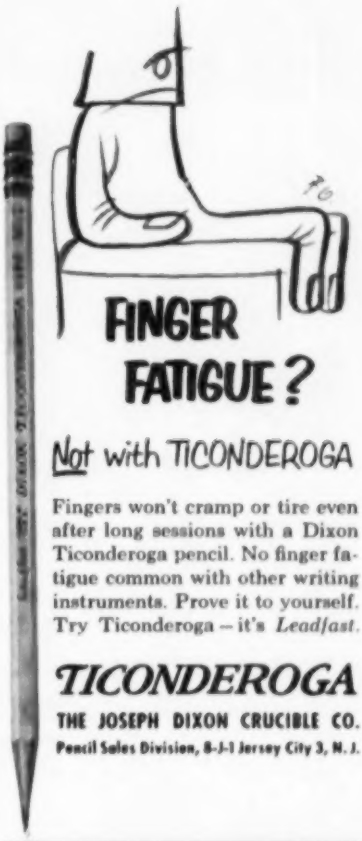
The war of course changed this reason for postponing a mechanization of the office, but it created a new reason for delay—physical production was going into war goods, not office equipment. Then, too, of course, the war switched us from an overbundance of labor to an undersupply, not only in the clerical areas, but also on production lines. The natural evolution of office mechanization was artificially delayed for another period of years.

Since the war, of course, the pendulum has swung far to the other side of the orbit. During this period of lessening interest in the lower level clerical jobs, and a general shortage of labor, engineers and office machine manufacturers have been feverishly exploring the possibilities of electronic equipment in the light of office requirements.

During this period in effect, we have had not the beginning of the office revolution, as it has been so often mistermed, but the beginning of a second phase of an office evolution that started a long time ago—a phase artificially delayed for so long by outside circumstances that its appearance in the past few years made many businessmen feel that something totally new and revolutionary had happened.

The potentialities of the electronic developments of the last ten years cannot be predicted accurately and completely by anyone at this time. Where they will lead us no one can say. What we can say is that some of the things that have been said about electronics are exaggerations *as of now*. It can deliver a lot. It cannot do everything in the field of simplifying office operations that its more enthusiastic constituents have claimed.

There are three main characteristics of this second phase of the office revolution—what we might term the dawn of electronics in office operations. These are: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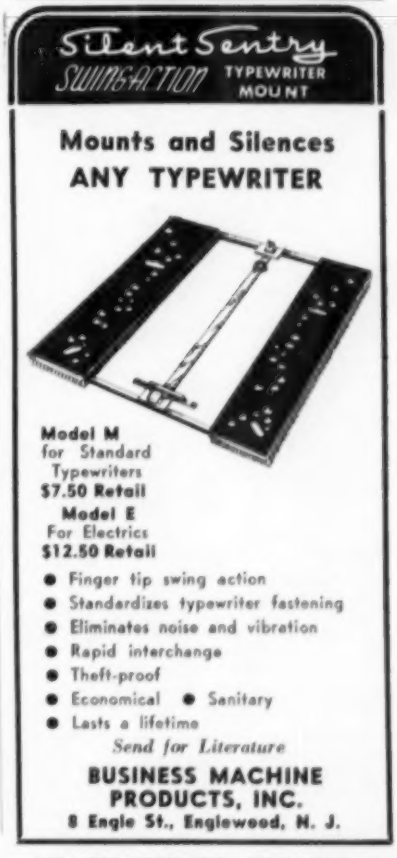

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Speed of calculation. This is the area which has to date received most attention. Minutes on the electronic machines replace hours, even weeks, of human computation time.

It is this vast speed which makes possible so many operations that have never before been possible. They have not previously been impossible because of man's inability to perform them, but rather because of man's inability to perform them in a short enough period of time for them to be worthwhile. This is the data processor's great advantage in its most promising field, that of extending the range of management planning, of aiding operations research, etc.

That is its advantage. That is its first characteristic.

Its second characteristic is a disadvantage—the high cost of electronic data processing equipment. This is an important disadvantage, and one that has been ignored by too many businesses in their eagerness to be "in the swim", to have an electronic data processor simply because someone else had one.

The intelligent company, in its planning, will equate this disadvantage against the computer's primary advantage in terms strictly of its own needs, not in terms of what someone else is doing.

The third characteristic of the computer is the least publicized of all. Yet to me, it seems by far the most important. That is the data processor's ability to organize work. Thus, it can perform a whole cycle of sequential related operations as a self-contained unit, carrying forward a flow of work toward the desired result *without human intervention.*

To a degree the same automatic performance of operations has been available to us for years through punched card installations, but even with these highly automatic units, it is still necessary for operators physically to transfer the cards from one machine to another, to set up each machine, and to switch panel control boards. Human operators are still required to check each individual procedure, and to insure that each procedure has been performed correctly before beginning the next procedural step.

The new data processing machines allow us to eliminate much of this need for physical transfer, and human checking. This gives us double benefits: it cuts total processing time, and it eliminates almost completely human error as we customarily understand it.

It eliminates human errors in individual instances, but there is a reverse side to this great advantage; when a human error does occur in an electronic data processing installation, it can have consequences far more serious than any one error would be with simpler machines.

People must control

This is a point which management should always remember. Machines can handle routine processing work much more accurately as well as much faster than human beings, but the ultimate control of every machine, which means the ultimate control of all the thousands of actions performed by the machine, still rests with human beings. As we mechanize and use fewer people, the human decisions of each of the remaining people become constantly more critical.

Thus, with conventional machines, an operator may make a single error on a single entry, and it is not of earth-shaking consequence, even though it is an irritating and time-consuming operation sometimes to find that error and correct it.

But consider the consequence of a single human error in programming instructions on a machine which is to perform thousands upon thousands of sequential operations based on those instructions. Consider the seriousness of a single error in the information fed into the machine, if that information is the basis for a whole pyramid of sequential operations. The single error will be multiplied thousands upon thousands of times, throwing every answer given to any question involving that one bit of information into error.

By increasing mechanization, we automatically increase the degree of responsibility and the necessity for absolute accuracy at all times weighing on every human being in the office. The clerks once were the privates in our office mobilization; with new data processing machines taking over the simple basic duties our people automatically become the generals. It's unfortunate if a private makes a mistake, but it usually doesn't lose the war. When a general makes a mistake, it's a catastrophe.

This underlines a point that has

often been overlooked by management in its wide-eyed pursuit of the "automatic office". As we move into newer worlds of mechanization, the need for people of the highest level becomes more acute, not less so. We may be able to cut down on the quantity of personnel—although even that is debatable—but we should realize fully that we definitely are going to have to raise the quality of personnel as we move toward automation.

This is a lesson we should be aware of these days very clearly after our experience in the 1930's when punched card installations were first being tried out. We learned then the hard way—the very hard way—that you can't discount people when you make machine installations, that the more routine work the machines take over, the more important the role of each worker becomes.

We can learn a lot from the lessons of the 30's with punched card installations as we advance into the similar new opportunities given us by electronic data processing units. Moreover, we can, by analyzing our present card units again, project a lot of the things we learn into a realm that is still unknown to so many of us—the realm of the electronic data processor.

If we were to approach an efficient punched card system, wave a magic wand, and transform it into an electronic data processing unit, we would find that some things about it had changed radically, some things, surprisingly, had hardly changed at all.

There would be no basic change in certain basic requirements of the installation. Thus, both punched card installations and electronic data processing installations have these points of similarity:

1. Each requires standarization of requirements and coding of data and procedures.
2. Each is able to digest large quantities of details.
3. Each is able to "organize" work.
4. Each is able to calculate.
5. Each is able to verify data automatically.
6. Each is able to reproduce information automatically without error.

Basic differences that would appear if our magic transformation were possible would exist not so much in the actual abilities of the two different types of installation, as in their speed, capacity and personnel requirements. Thus, the differences that would appear as our punched card installation changed into a data processing unit before our eyes, would be:

1. Elimination of operators moving from machine to machine.
2. Much greater speed in the processing of information.
3. The possibility of using the unit 24 hours a day with relatively little supervision.
4. A much higher initial outlay for equipment.
5. Less personnel required, but the need for higher calibre personnel, each of whom is charged with heavier responsibilities.
6. Much more serious results if any human error occurs.

Are punched cards for you?

There is more to be gained from inspecting a present punched card unit than merely noticing how many similarities there are between it, and the electronic data processor, however. For these similarities may suggest a much more fundamental thing: is the electronic data processor really necessary to your company's operations? Have you explored everything that can be accomplished with a punched card installation? Basically, the punched cards can carry out almost all the routine data processing activities that the computer can, but they cannot perform them as quickly. But does your own work volume require the great speed implicit in a computer installation?

Moreover, there are other factors to be considered in evaluating a gleaming new computer against further development of the tools you already have. Do you have the funds necessary for a computer installation? Such an installation is not covered merely in the cost or rental of the machines. It means heavy investment in methods and systems research before the machine can even be used, expenses for conversion of all your work processes to eventual use in a computer, expenses for training your personnel in the use of the new equipment.

Do you know what it costs to house and air condition a large computer?

And, last of all, what about your personnel? Are they equipped, or can they be trained to handle, the elaborate new equipment which is available?

All these factors should be evaluated very carefully before you plunge ahead into electronics.

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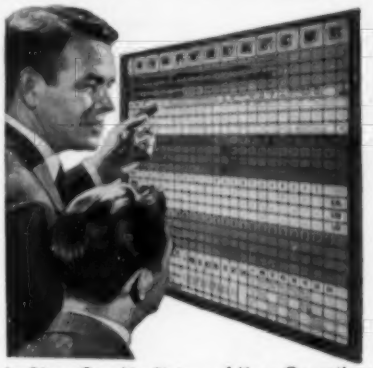

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There is still another reason for looking again at punched card installations with a searching, but critically constructive eye before considering seriously an electronic data processing unit. It is this: electronic data processors do not mean the end of punched card installations, any more than the appearance of punched card installations meant the end of simpler machine methods in the office.

Each new machine development in the office complements previous developments. It may take over some work previously done by simpler machines, but it never altogether supersedes the simpler units. For small installations, for low volumes of work, the simpler units are often better in terms of efficiency as well as lower initial costs than the more elaborate units which have too high a capacity for the needs of the installation.

An axe is still a more efficient tool for chopping kindling than a power driven saw.

Thus, each new development in the office field represents an addition to the equipment already available, rather than a replacement for it. Depending on the load of any given office, that addition may be needed, or it may not. But it seldom, if ever, totally replaces the existing equipment in the office which does use it. It takes over those jobs which it can perform most efficiently, while the earlier equipment continues to play the role which it can play most effectively.

With these things firmly in mind we can approach the possible question of an electronic data processing installation with a more or less realistic foundation of fact from which to proceed. How then do we find the information which will guide us to a decision as to whether an electronic data processor is for us?

There are plenty of sources. There have been very few innovations in the history of American business as thoroughly publicized as the advent of electronic data processors. Much that has been written about them has been nonsense, but there is a solid core of fundamental and important information on the subject. Colleges are beginning to give degree courses in the subject; seminars and individual courses are available in many universities.

Beyond this source of generalized management knowledge, there are the specialists whom we can consult, the professional management consultants, first; the machine manufacturers, second; and the technical members of our own staffs, third. We must weigh each bit of information in these fields according to its source. Each of these three groups may very well have its own axe to grind, and would find it pretty difficult not to have some subconscious bias. But with this realization giving us a compensation for their opinions, we can derive much valuable information from each of these groups.

Last of all, we in management can look within ourselves for some of the answers, some of the most important answers to some of the most vital questions. For in the last analysis management holds the most vital key of all as to whether an electronic installation is necessary, and, if so, of what kind. Only management knows what it feels the most important objectives of its company are.

The first and most important question we must ask ourselves is this:

What main problem are we trying to solve? (*To page* 198)

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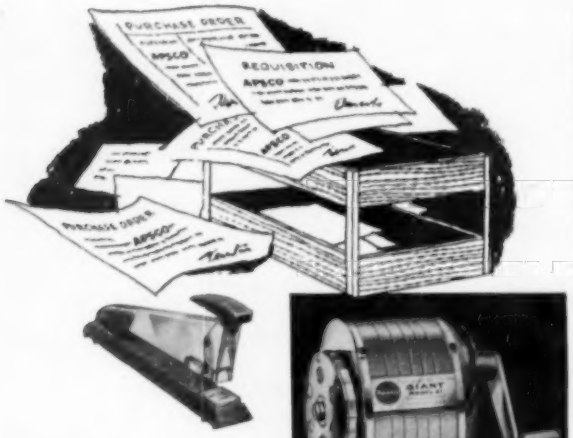

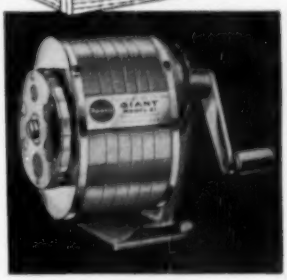

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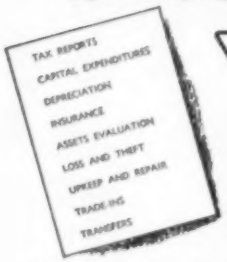

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Are we looking for speed in reporting inventory? Or is enlargement of the scope and accuracy of our business forecasting the most important objective we wish to attain? How are we now meeting the problem which we think may be solved more easily by electronics, and in what particulars are our present procedures inadequate? If it is a punched card installation that is now handling our particular project, are we sure that the most efficient methods of using those punched cards have been tried? Punched cards do not, after all, represent a single, rigid procedure for doing work; they are a *manner* of doing work. Thus, they can be just as inefficient from wrong or not fully planned applications, as they can be efficient from right application.

This is the first question: is an electronic computer of any type what we really need to solve our particular main problem?

If, after thorough analysis, it seems it is, another main question presents itself: What type of computer?

Should we solve our problem by using part of the capacities of a general purpose computer, or would it be best to solve it through use of a special purpose machine.

This is a vital question, and makes it absolutely necessary that we look at our whole problem and our company's whole way of doing things in perspective. In spite of the continuing controversy that goes on between the adherents of the special purpose computer and those who maintain that only the big machines which can do a variety of different jobs are adequate for today's business needs, there is room in the many specialized fields which business has developed for every kind of electronic device. Companies which have planned carefully, and analyzed their needs scrupulously have had success with every kind of electronic unit; there are plenty of installations which are gaining advantages from the use of the Univac and the IBM 700 series; there are many others using special purpose machines which have had an equal degree of success in their field.

By the same token, companies which have plunged in and bought expensive equipment without completely adequate planning have had bad experiences with both types of installation.

The Bankers Trust approach

Let me illustrate what we hope is a cautious and yet open-minded approach to office electronics by describing what is being done at the Bankers Trust Company in this new, promising field. Basically, our program has four major bases:

1. We are maintaining an open mind about all machines.
2. We are continuing to investigate every possible application of punched cards.
3. We are expanding our present punched card systems.
4. We are exploring the potentials of advanced mechanization.

Thus, we are not marrying ourselves to any one machine, but rather retaining the advantages of being free to use whatever combination of machines and methods can best accomplish any given job. One of our individual systems may depend on a combination of manual, automatic, and punched card units. We have even returned to pen and ink postings in some areas.

As an example of what we mean by combinations of various different machines and methods to perform a particular job, there is the method we follow for issuing dividend checks automatically. These checks, issued in large volume for our corporate customers, are on punched cards. The cards are first run through an Addressograph 9300, and then automatic punched card equipment completes each check. The completed check is microfilmed on a Recordak, and finally mailed by an inserting and mailing machine. Each of the steps is done automatically, and at high speeds, with only physical transportation of the checks from machine to machine required of the operator.

We are satisfied, at the moment, that there is no better way of doing this particular job.

The second of our bases, the continuing analysis of punched card systems, their advantages and disadvantages, gives us, we feel, the opportunity to refine continually the systems we now have operating. It simultaneously prepares us better for possible eventual conversion to some higher speed method of processing data. Basically, punched cards and computers work according to the same principles, with the distinction that the computer performs its steps very much faster than punched card units, and performs a greater sequence of steps within itself. Therefore the more we learn about electronic accounting machine "philosophy" in general the better will be our preparation for whatever may develop in the future.

At Bankers Trust, we are continuing to expand our punched card systems, as we have been ever since the end of the war. We have now six different punched card installations, following a principle developed years ago, of increasing our use of punched cards through decentralization. Thus,

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many of our departments have self-contained punched card units, which were created and trained in the central unit.

Now let's see just what we can accomplish with our six installations. Their total capacities are these: they can calculate and punch cards at a rate of 500 per minute; they can list at a rate of 2500 per minute; they can reproduce 1500 cards per minute, and sort 9700 cards per minute.

This is, we think, a fairly substantial rate of production, and furthermore it offers one tremendous advantage; production cannot be interrupted or seriously handicapped by the failure of any one machine, or even one complete installation. We have a multiplicity of machines; the failure of any one of them would not be too serious.

But our continued adherence to known and tested punched card techniques does not mean we are blind to the possibilities of the electronic data processor. We are exploring every development in automatic data processing through the medium of a small study group of qualified people.

I think this type of research group should be considered by every company which is thinking in terms of an electronic installation. The size of the group, we feel, should be small. Experience in the company's present operating procedures is very valuable within such a group, but even more valuable is creative imagination and a strong sense of the realities among its members. An open mind, capable of hard-headed objective thinking, is an essential quality for its members.

Staff group can help consultants

Such a group can serve as a guide to outside consultants, if planning for a system changeover to electronic data processing is called for. It can also serve as a check on the enthusiasm sometimes displayed by outsiders who will not have to live with the results, or iron out the thousand small things that can go wrong.

As an illustration of how we are using this advanced study group, let's review briefly how we are attacking the problem of simplifying the chief operating job faced in the banking business today: clearing checks and maintaining checking accounts. We are proceeding along three paths. Our own staff is making a projection of what might be accomplished with electronic equipment. A manufacturer of electronic equipment is making a similar survey, and the third approach is being made by an electronic consulting firm. When we evaluate the three studies against each other, we think we will arrive at some basic conclusions that are sound and feasible as to what might be done with electronic equipment in this field.

In the meantime, however, and throughout the foreseeable future the punched card installations which have been so beneficial to us will continue to be important. Even in companies where electronic data processing units have been installed, punched cards remain one of the best input devices for the processor. Moreover, in small installations, and in certain preparatory work before final computer processing, punched cards will continue to have a vital role to play.

Finally, a punched card installation is the foundation on which a successful electronic data processing installation can be planned. Punched cards are, in a very real sense, the building blocks of office automation.

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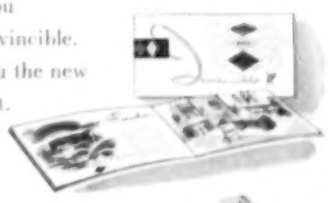

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